EXCAVATIONS AT HULAS
(1978 – 1983)

(From Harappan times to Early Medieval)

K.N. DIKSHIT

with contributions from

V.C. Sharma
D.V. Sharma
Y.S. Rawat
Syed Jamal Hassan
D.N. Dimri
K.K. Sharma
Hari Om
K. S. Saraswat

Archaeological Survey of India
New Delhi

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Contents

List of Illustrations

A. Figures

Chapter – I

Chapter - II

Chapter III

Chapter IV

B. Plates

Chapter – I

Chapter III

Chapter IV

Chapter V

Chapter VI

CHAPTER – I

Introduction

The ancient site at Hulas (Lat. 29° 15' and Long. 78° 40' E), located in Nakur Tehsil of the district Saharanpur, western Uttar Pradesh, is about 8 kilometres west from Nanauta, a small town on Delhi-Saharanpur state highway **(Pl. I)**. The site was explored by Shankar Nath of the Archaeological Survey of India under village-to-village survey of the Antiquarian Remains (*IAR* 1964-65: 43-44). The mound is rising about 5 m above the surrounding plains, measures approximately 330 m north-south and 172 m east-west **(Pl. II)**. The main objective of the excavations was to uncover the details of the Harappan culture especially in the *doab* and subsequently to provide a culture-sequence to the upper part of the Ganga valley. The site was under regular excavations by the Archaeological Survey of India for the five consecutive seasons (*IAR* 1978-79: 60-61; 1979-80: 82; 1980-81: 73-76; 1981-82: 72-74; 1982-83: 100-103).

Background

The Ganga-Yamuna *doab* which is the crucible of Indian culture has witnessed the great drama of Oriental history. It has been the scene of frequent human migration and invasions. This region was to India what the fertile valley of Tigris and Euphrates was to ancient Iraq, valley of Nile to Egypt and Yellow river to China. The network of ancient highways also made *doab* the meeting place of diverse cultures.

The archaeology of Ganga-Yamuna *doab* from primitive life to historic urban growth cannot be discussed in isolation without considering the cultural developments of the fringe areas. The antiquarian remains of Ganga-Yamuna *doab* were known in the past by accidental discoveries which have become a characteristic feature of Indian archaeology. From outer fringe of *doab* in 1940-44 was noticed for the first time, the earliest pottery of Iron Age, known as Painted Grey Ware in the lowest levels of Ahichchhatra (Bareilly District) (Ghosh and Panigrahi 1946: 37-59) but the full significance of this ware was not then realized. In 1950-52, Hastinapura (Meerut District) (Lal 1954-55: 147-149) provided for the first time a Cultural Index for the upper Ganga basin. The discovery of copper-hoards and Ochre Coloured Ware at Bahadarabad (Saharanpur District) (Lal 1953: 93) in 1951 and Harappan pottery at Alamgirpur (Meerut District) (*IAR* 1958-59: 50-55) in 1958 were all tantalizing chance finds.

From 1962 to 1965, a planned and systematic exploration was taken up from Hastinapura to Rishikesh along the right bank of Budhi-Ganga (*IAR* 1962-63: 36-37; 1963-64: 53-56 and 1964-65: 43-44). Further the upper portion of the Yamuna valley and its tributaries falling in Saharanpur District were also explored from the foothills of Siwaliks upto the level land of Saharanpur. In 1963-64 excavations were conducted by Archaeological Survey of India at Ambakheri and Bargaon both in District Saharanpur (*IAR* 1963-64: 56-57). AT the same time a portion of central *doab* was also extensively tapped by Aligarh University. Just outside the lower *doab*, excavations were conducted at Rajghat (Narain and Roy 1977), Prahladpur (Narain and Roy 1968) and Sohgaura (*IAR* 1961-62: 56). From 1962 to 1964 the Banaras Hindu University and Allahabad University found at many places structural remains of iron using megalithic people.

In the last-decade between 1970-80, a number of problem oriented excavations were taken up by different organizations at Kaseri (*IAR* 1963-64: 92; 1969-70: 43), Sonkh (*IAR* 1966-67: 41-43; 1968-69: 40; 1969-70: 42-43; 1970-71: 39-40), Allahapur (*IAR* 1970-71: 40-41), Mathura (*IAR* 1954-55: 15-16), Kampilya (ASI – AR XI: 11-13), Jajmau (*IAR* 1956-57: 29; 1957-58: 49; 1961-62: 57) and Hulaskhera (*IAR* 1965-66: 53). In Belan valley excavations at Chopani-Mando (Sharma and Mishra 1980), Mahadaha (Sharma *et al.* 1980) and Mahagara revealed a sequence from Epipalaeolithic to Neolithic times but Koldihwa (*IAR* 1973-74: 26-27) provided developmental stages starting from Neolithic times. The excavations at Ayodhya, Sringaverapura (Lal and Dikshit 1978-79: 1-7), Bhardwaj Ashram and Pariar (Lal and Dikshit 1979-80: 26-31) were taken up as part of a National project '*Archaeology of the Ramayana Sites'.*

Scope

The present work was taken up keeping in mind the regional dynamics of the eastern expansion of Harappa culture from Ravi to Sutlej as was revealed by the excavations at Ropar (Sharma 1955-56: 121-129) but its further stages of expansion were not clear from Sutlej to Yamuna where new cultural traits emerged and localized cultures such as Bara (*IAR* 1954-55: 9-11) in Punjab influenced its material makeup. The excavations at Alamgirpur which were of very limited nature could not throw any new light whereas at Bargaon (*IAR* 1963-64: 56-57) no new evidence was marshalled out. The second issue was about its overlap with the Painted Grey Ware culture as was reported from some sites in Punjab and Haryana. The position of black-and-red ware and black-slipped ware as a pre-PGW culture was also to be ascertained at this place, although, in exploration, the search of these wares was limited. The subsequent cultures such as Northern Black

Polished Ware etc. were already excavated on a large scale in upper and lower Ganga-Yamuna *doab*.

Physical Features

Physiographically in the north of *doab* are located the steep hills of the Siwalik chain, while below the hills lies the submontane belt and a moist Tarai tract merging rapidly into the level country of *doab*. This portion is divided into two areas: Bhangar (older alluvium), an upland running north to south, and Khadar (newer alluvium), a low-land comprising the alluvial valley of the Ganga and the Yamuna on either side. But again in the south, it is covered by the hills of the Vindhyan complex. Of the numerous torrents, those on the west flow into the Yamuna while those in the centre and the east drain into the Ganga and its tributaries like Gomti, Gandak and Son.

The plains of Punjab, Haryana and Upper Ganga-Yamuna *doab* are bordered in the north by three major fold axes of the western and central Himalayas - the Himadri (Greater Himalaya), Himachal (lesser Himalaya) and the Siwaliks (outer Himalaya). The Siwaliks which are mainly river deposits of the Middle Miocene to the Lower Pleistocene age folded into arches and triangles extended from Jammu in the west to Arunachal Pradesh in the east. The major rivers viz. the Indus, Sutlej, Yamuna and Ganga have cut through deep gorges of the Himalayas to escape into the great plains. The northern Rajasthan is geographically an extension of the Punjab-Haryana plains. Along the northern margin of the plain lie two narrow strips viz. the Bhabbar region composed of unasserted debris from the Himalayas and the Tarai region characterized by finer sediments, natural forest cover, ill-defined water channels and high water-table resulting in swamps and marshes (Singh 1971: 7). In comparison to Punjab plains, the thickness in the alluvial sediments which depends on the alluvial-morphological processes is maximum in the Ganga plain. It is distinguishable into two types - the *Khadar* (newer alluvium) and the *Bhangar* (older alluvium). The Delhi ridge is a subdued extension of the Aravallis. The changing river courses represent interesting geomorphic processes in the plains.

Drainage

The north Indian drainage is broadly divided into the Bay of Bengal drainage and the Arabian Sea drainage with distinct water partings due to elevated Sutlej-Yamuna divide. The Indus system falls in the Arabian Sea, whereas the Yamuna and the tributaries which are now the rivers of Ganga system empty in Bay of Bengal.

The courses of north Indian rivers, commonly known as the rivers of the Indus system and Ganga system have played an important role in building up the topographical

feature of this region suitable for the growth of cultures. The tract lying between Saharanpur and Ludhiana, about 274 m above sea-level is the present watershed which divides the drainage of the Ganges system from that of the Indus system (Wadia 1953: 384). On the contrary the topography of the upper Ganga Plain is broken broadly by the Tarai-Bhabar submontane belt and on micro level by the river bluffs, levels dead branches of the river channels, the ravines and the river-channels themselves. However, it exhibits more stable Bhangar land. Throughout the region there is preponderance of local slopes over the regional slope. There is a slope from Siwaliks towards south and south-west, while in the south-east the Aravalli spurs provide a slope towards the north. It is only in eastern Haryana that the drainage in general has a southerly and south-easterly slope. The old high bank of Yamuna forms the summit level or the plains.

The Yamuna system is divided into several subsidiary systems by the important effluents of the river viz. Budhi Yamuna, Budhi, Saindhi, Katha, Hindon, Nagdeo, Dhamola, Kalinadi (west), Kali (Krishna) and Krishana. These streams ultimately take the water through districts of Shaharanpur and unite with Hindon. The Hindon is considered as the arterial drainage line of the upland track in the northern portion of the upper *doab*.

The area is also having a number of swamps, lakes and ponds but because of their size, the influence is purely local.

Climate

The Harappan civilization was spread over 1.3 million sq km area of Pakistan and India. In this area itself, there is considerable variation in climate, rainfall and temperature. But on the whole the area falls in an arid and semi-arid category. The north plains of Punjab enjoy a semi-arid monsoon type of climate as the region fails to get the full benefit from the south-west monsoon currents owing to a long distance from the seas. This climate as a whole exhibits a transition between the arid deserts of Rajasthan and the moderately humid upper Ganga plain.

In Punjab the average annual rainfall in sub-mountain tract is about 75 cm while in the extreme south-west it decreases to less than 30 cm. In upper Ganga plain the average annual rainfall varies between 50 cm to 140 cm with an uneven spatial distribution. While the submontane belt and the adjoining southern tract receives over 100 cm of rainfall, the Yamuna plain and the central fringe around Delhi is relatively dry less than 60 cm (Singh 1971: 135). In Punjab, there are the usual three seasons, whereas in upper Ganga plain, there are four well marked seasons i.e. the hot-summer, the wet-summer, the pre-winter transition and the winter. The annual average temperature ranges from 23.1°C to 25.1°C whereas due to proximity of Himalayas the maximum temperature is from 32.9°C to 34.5°C.

Beyond upper Ganga plain, the maximum temperature in summer goes beyond 40°C. Service storms are rare in this region.

Soils

Within a homogenous climatic region, a close correlation exists between the soil condition and the forest vegetation. The properties of a good soil are its depth, texture, structure, drainage, organic matter content, moisture, RH and nutrient level. It provides a medium for the growth of plants. Voelcker and Leather classified Indian soils into four major types (i) the Indo-Gangetic alluvium, (ii) the black cotton or regur soil (iii) the red soils and (iv) the lateritic soils (Randhawa 1980: 12-14).

In the alluvial tract of the Indus and Ganges system of rivers which has almost uniform topography and lithology, the soils are by and large homogenous. The soil consists of the deposits - alluvial loam and calcareous clayey alluvium. The older alluvium called Bhangar in the Ganges Valley is dark coloured, rich in concretions and nodules of impure calcium carbonate known as *kankar* and is generally above the flood level, seldom subject to inundation. The new alluvium called *khadar* is light in colour and poor in calcareous matter merging into the recent or deltaic alluvia. The sediments are sands, silts and clays with gravel beds and beds of peaty organic matter. The principal crops of the area are wheat, rice, sugarcane, cotton, barley, gram and maize.

Forest

Punjab and Haryana has a poor vegetal cover due to prevailing aridity, although in the remote past the south-east portion of Haryana and the sub-montane belt right from the bank of Yamuna to Ravi were covered with natural vegetation. Tropical dry deciduous forests from north to south have *kikar, shisham* and *dhaki.* In the past, the upper Ganga plain was also covered with thick forest but human occupation has gradually cleared the natural vegetation for cultivation. The forests in upper *doab* can be grouped as tropical moist deciduous, tropical wet and subtropical dry. In the last category, the main species are *shisham, babul, khari* and *semul. Sal* is present in Tarai forests, but it is of poor quality.

Tradition

Puranic traditions connect this area with a king of the Solar dynasty of Ayodhya known as Sagara, whose grandson Anshuman and latter's grandson Bhagirath were also associated with this region. This was probably the time when king Dushanta of Kaurava dynasty, a descendant of Puru, the son of a Yayati of the Lunar race established himself at Hastinapura. His son Bharat, is said to have ruled from river Sarasvati to Ganga and

performed a number of Vedic sacrifices on the banks of the Ganga and Yamuna (These traditional accounts have already been narrated in the excavation report of Hastinapura (Lal 1954-55: 147-149).

According to legend, in the middle of the 4th century BCE, the Kurus of the region were defeated by Nanda kings, who were ultimately defeated by Chandragupta of Mauryan dynasty. The excavations have also confirmed that the area was under Sungas, Kushans and Guptas. The early Muslim chronicles have not given any importance to this area although it was very close to Deoband and Delhi.

Cultural Background

Just from outer fringes of *doab,* lower Palaeolithic and microlithic tools were noticed in the Singrauli basin (Mirzapur District) and a microlithic industry from Siddhapur (Banda District). A few years ago G. R. Sharma brought to light a blade industry from Banda which he placed at that time between levallois flake industry and microlithic industry. This evidence is now supported from his new discoveries in the Belan river (Allahabad District), where in the lowest levels a blade industry was found associated with Middle Palaeolithic scrapers but in middle levels it developed into a non-geometric microlithic industry.

Other Stone Age cultures in *doab* are represented by the non-geometric microliths un-associated with any kind of pottery as noticed at Mirzapur, Sarai Nahar Rai (Pratapgarh District) an open-air settlement revealed in excavations, the microliths of both the varieties. Besides, a number of skeletons lying in extended position in oblong graves with a western orientation were also noticed. The pottery is largely handmade. In a few graves at Mahadaha double burials were noticed, but in multiple burials equal number of males and females were buried. At Bahadarabad, a stone industry was noticed in the lowest stratum associated with a tool-complex assignable to broad faces (i) the cleaver-chopper made on a mammoth lunate and, (ii) jagged, wavy-edge scrapers of the Sohan type.

The first find of Neolith in India was made by Le Mesurier in 1860 from the valley of Tons river, a tributary of Yamuna. The Neolithic tools were collected from the right bank of Yamuna from the districts of Hamirpur, Mirzapur, Allahabad, Banda and Kanpur. From Lodhawara (Banda District), it has been noted that axes were grounded only on their working edge and each axe had two small pits on either side probably meant for securing a grip while in use and not for hafting.

The recent excavations in Belan valley established the ascent of Man from the end of Upper Palaeolithic to Neolithic times. Chopani-Mando presents a gradual evolution and adaptation, whereas Koldihwa and Mahagara offer a picture of Neolithic village settlements. The cultivated rice-husks and rice-grains in carbonized form found at these sites were

dated to 7th - 6th millennium BCE. In South India Neolithic culture overlapped or succeeded at many places by iron-using megalithic folk. The megalithic types reported from the districts of Allahabad, Mirzapur and Varanasi do not show any cultural relationship with the South Indian examples.

Harappan Civilization

A systematic survey in the upper plains of *doab* revealed more than 70 Harappan sites which were confined only to the Yamuna tributaries. Most of these sites are circular as well as rectangular located at a distance of about 8 to 12 km confirming the Harappan pattern of linear or nucleated settlement as noticed in Gujarat and East Punjab. The detailed study of these sites would throw light on the density of population in this region **(Fig. 1)**.

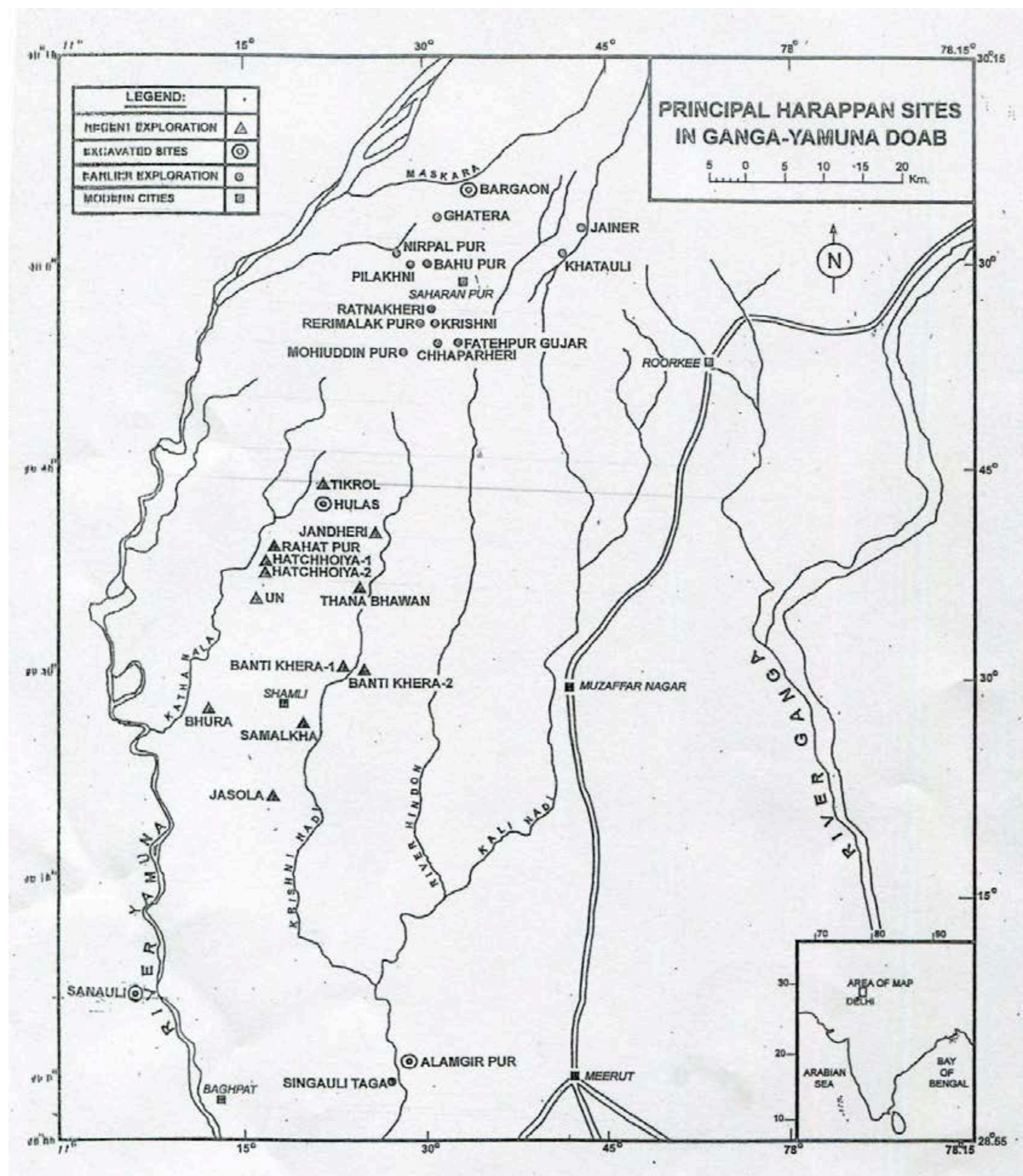


Fig.1. Principal Harappan Sites at Ganga – Yamuna doab (Mamani, 1984)

In order to ascertain the culture-complex of Harappan Civilization in *doab* the excavation at Alamgirpur revealed in the lowest level typical pottery; both plain and painted, terracotta objects, cubical dice-beads, bangles, a broken blade of copper, kiln-burnt bricks, inscribed through and impression of cloth. This was followed by another limited excavation at Bargaon (District Saharanpur), a single site having an occupational deposit of 1.50 m. The excavation confirmed the continuance of Harappan traits as noticed at the former site. Other interesting antiquities include copper rings, chert blades and weights, stone querns and a bull headed toy-cart.

Ochre- Coloured Ware

The Ochre-Coloured Ware was noticed for the first time in the lowest levels of Hastinapur. It was found in fragments which were all ill-fired without any slip and when rubbed left ochre-colour on the fingers. The horizon of this ware was devoid of any other cultural traits. Thereafter, it was also noticed at Atranjikhera, Noh and Jodhpura, the last one being outside *doab.* At Saipai, this ware was found in excavation with Copper-hoard implements, otherwise this association was only circumstantial. Other single culture excavated sites of this ware are Bisauli, Rajpura Parsu, Bahadarabad, Ambakheri, Lai Qila and Baharia. The study of this ware from different sites revealed two areas of development: Central *doab* and Upper *doab.* The pottery types in Central *doab* are not only limited but their finish is also inferior, whereas the Upper *doab* has a variety of utilitarian types which are also common with the Harappan assemblage found in this region.

Not a single site of the Ochre-Coloured Ware has provided the exact chronological position of this ware in relation to the Harappan Civilization. The chances of this culture evolving locally somewhere in the Central Ganga-Yamuna *doab* and then their migration to Upper Ganga-Yamuna *doab* and east Punjab are rated high. Recently thermoluminiscent tests on the Ochre-Coloured Ware sherds have provided a long time bracket *(c.* 2650-1180 BCE) to this culture. It is needless to emphasize that more dates are needed for an acceptable chronology.

Copper Hoards

The authorship and age of copper-hoards is still enigmatic. Most of the finds which are chance discoveries are unstratified and unassociated with any other cultural trait. In *doab* Copper hoard specimens are represented by the anthropomorph, the antenna sword and the barbed harpoon, besides other types. Recent fieldwork in Rajasthan, Haryana, Madhya Pradesh and Eastern India has provided some new data forcing a reassessment of earlier theories. A hoard of Copper celts in association with O.C.W. was also found at Nandalpur (Jaipur District) whereas from Chittaurgarh the chance discovery of celts is reported from Ahar matrix. The lumping of all the copper objects under the title of copper hoards should be discarded. The copper specimens of Madhya Pradesh, West Bengal and Odisha should not be considered as a part of Copper-hoard vintage, Excavations from Mahishadal, Midnapore District, West Bengal revealed a flat celt of copper from painted black-and-red ware complex.

In recent years several metallographic analyses of Copper-hoard samples revealed that in alloying techniques these people stand as a class apart from the Harappan and other Chalcolithic culture. They did not use cold work and annealing although they knew closed cast technique with pure copper. The Copper hoards are required to be further studied from technological angle. The age of the Copper-hoard is difficult to assign. In *doab* these types are assigned the date to that of the Ochre-Coloured Ware.

Black-and-Red Ware

The excavation at Atranjikhera (Etah District) (*IAR* 1962-63: 34-36; 1963-64: 45-49) brought to light a new cultural phase of the black-and-red ware. This phase appears in between the Ochre-Coloured Ware and Painted Grey Ware. Besides pottery, hearth, charred bones and copper objects, a few small cores and flakes of chalcedony, were also noticed in this level. A similar phase but devoid of other *inter-alia* was also noticed at Jakhera (Etah District) (*IAR* 1959-60: 75) and Pariar (Unnao District). At Allahapur (Meerut District) the preponderance of this ware over the Painted Grey Ware was noticed in the earlier two layers, but at Khalaua (*IAR* 1965-66: 41-42), Sonkh, Kaseri, Alamgirpur and Hastinapura, this ware is coeval with the Painted Grey Ware. At Sringaverapura (Allahabad District) it was noticed in pre-NBP horizon but continued with the early NBP phase. Similar is the position at Prahladpur and Rajghat.

How, when and from where the black-and-red firing technique penetrated in this region is yet to be worked out. However, it may be mentioned that black-and-red ware is more or less absent in Saharanpur District. In adjoining Haryana and Punjab there is no separate horizon of this ware.

Painted Grey Ware

The chief concentration of the Painted Grey Ware culture is the upper Ganga, Sarasvati and Sutlej valleys. Formerly the distribution zone of this ware stretched upto Vaisali, but in Seminars on Indian Archaeology or on Pottery at Patna (1968), Aligarh (1968) and Bombay (1972), even Kausambi was not accepted as an eastern outpost of this ware. Now Pariar (Unnao District) stands as the easternmost excavated site of this culture, where PGW was found enjoying an independent status, although the varieties of the fine painted designs are conspicuously absent.

It is essentially a village culture with wattle and daub houses and a subsistence pattern based on the cultivation of rice and use of domestic animals. They used the objects of copper, iron and bone. The PGW deposit at Hastinapura is dated from *circa* 1100-800 BCE. There is a solitary radio-carbon date of the first millennium BCE from Atranjikhera

(TF 191) 1025 ± 100 BCE, but most of the other dates of this culture provide a longer time-span.

Except at Hastinapura where there is a cultural break, the PGW culture overlapped with Northern Black Polished Ware, as is evident from the earliest levels of Ahichchhatra, Sonkh, Atranjikhera, Noh, Ropar and Sravasti. From the upper levels of Allahapur, a terracotta sealing was found inscribed in Mauryan Brahmi characters.

It would not be out of place to mention about a red ware having paintings in black found in the lowest levels of the defences at Kausambi. Similar pottery was also picked up from other localities of this region viz. Onaur, Saraikala and Unchadhih. K.K. Sinha has put this pottery around 6-5th century BCE. Typologically it has no connection with any phase of the Harappan Civilization as worked out by Lal, Thapar and the author.

Cultural Sequence

The excavations at Hulas revealed five cultural periods: Period I represented by the remains of Harappa culture **(Pl. III-IV)**; Period II by the Painted Grey Ware Culture; Period III by the Northern Black Polished Ware Culture; Period IV by the Sunga-Kushan Red Ware Culture and Period V by Gupta and Early Medieval Wares (Dikshit 1982a: 339-351).

Period I

It yielded the typical painted Harappan Ware, as well as some non-Harappan wares from a 2.40 m. thick occupational deposit. The characteristic Harappan forms are restricted, whereas new types such as the dish-on-stand with drooping rim, jar with horizontally splayed out rim, medium-sized jar with everted rim, bowl-like lid with central knob and a few miniature pots with a ring or pedestalled base were in profusion. The painted motifs executed in black pigment, comprised simple bands, triangles, rows of hatched diamonds with horizontal bands, chains within bands, leaf patterns and dancing peacock with hatched body. The incised decoration on the exterior of the pots consisted of a set of wavy lines, sigmas, chevrons and cord impressions. However, the number of incised sherds was limited. A sherd with compartmented design on the inner side was also noticed. Other finds include terracotta objects, beads, bangles, animal figurines and cart-wheel with raised central hub; faience beads; bangles and pots; beads of agate, fragments of copper bangles, bone points, stone querns and pestles. The terracotta cakes were oval in shape with pointed ends, although other varieties like the rounded ones with deep finger impression in the centre were also found **(Pl. V)**.

Fragmentary kiln-burnt-bricks bearing three finger marks with husk as degraissant and a dish-on-stand were also encountered from an oval hearth located on the southern

edge of the habitation. Two more circular hearths possibly used for firing small clay objects were also noticed. Evidence of plan of mud brick houses and circular huts with reed-impressed plaster were also noticed.

A solid mud-structure, possibly a platform was found running in an exposed area of 46 X 35 m on the south-east and south-west side of the mound. It was possibly raised in two stages and was built as a protective measure against the floods. A ditch of ancient rain-gulley, about 0.90 m to 1.20 m deep separating the Harappan settlement from that of the Painted Grey Ware Culture (hereafter PGW) was also encountered at the depth of 4.30 m in the middle of the mound **(Pl. VI-XI)**.

A few potsherds revealed the impressions of rice husk. The husk had a regular chess board pattern with wavy rows. The meshes in the husk were stretched vertically (a bit squarish) with the granules covering major portion of the mesh. On examination, the ornamentation pattern of the husk revealed characters - common between the cultivated rice *O. sativa* and the wild perennial *O. rufipogon* (Vishnu-Mittre and Savithri 1982: 205-221).

Period II

The Painted Grey Ware people did not occupy the area deserted by the Harappans, instead they settled on the virgin soil lying to the north and east of the Harappan settlement. This period, represented by a 1.30 m thick, deposit yielded the Painted Grey Ware, plain Grey, black-and-red, black slipped and associated red wares. Other finds included: bone stylus and pointer; copper objects including antimony rods; iron slags; terracotta objects such as ghata-shaped beads, discs, and bangles; and stone objects. A mud floor 'with post-holes' was also encountered, clearly establishing that they were living in huts covered wattle and daub. The important motifs on the Painted Grey Ware sherds were groups of straight lines separated by two rows of dots and wavy lines. The individualistic designs included concentric circles, semi-circles and sigmas were mostly confined to the outer side, but a few on the inner side were also found. A bowl with a flat disc base in PGW fabric was a new type. The shapes in associated red ware represented lid, lid-cum-bowl and bowl with folded rim. The bowls and dishes, are the important forms in the black-slipped and black-and-red wares. A strap-handle in black ware was also noticed.

Period III

It is represented by 0.90 m thick deposit and overlapped in the lowest levels with the Painted Grey Ware deposit. The NBPW and black slipped ware were represented by a

limited number of sherds. Important shapes in the grey ware included straight sided bowls, cups and dishes with incurved sides and sagger base. Types in the associated red wares comprised Ahichchhatra XA, carinated *handi*, basin, storage jar; vase, miniature pot, lid and bowl. The important finds comprised of terracotta objects; beads, wheels, human and animal figurines; stone balls, bone points and beads of glass and carnelian. Special mention is made about plaquettes made of bone / tortoise shell that may have ritual connection with a disease like small pox.

Of particular interest was a high double storage jar (inner and outer jars) encountered at the depth of 1.10 m from the surface. The bottom was lined with 7 wedge-shaped bricks having the breadth of 21 to 23 cm and thickness of 6 to 7 cm. The diameter of the inner and outer storage jars was 1.00 m and 1.15 m respectively. Both the jars were found crushed.

Other structure of this period was an elliptical hearth comparable to those found at Mathura and other sites in northern India.

Period IV

This deposit is 2.20 m thick and directly overlies the deposit of Period III. It yielded plain and incised red wares. The types included spouted jars, lids, sprinklers bowls, storage jars, basins, etc. Notable finds of this period were beads of semi-precious stones, copper coins, shell bangles, bone pieces, terracotta objects, a plaque showing mother with child, human and animal figurines, bangles, and sealings. A few structures of mud and burnt bricks were also noticed.

An important massive burnt brick structure was also encountered. The main wall was having a width of about 2.10 m and the size of the bricks used therein was 52x28x8 cm. The height of the wall was approximately 1.80 m, with 18 brick courses. The exposed west arm of the wall was about 52 m long and the north south was 30 m. The structure at the corner was roundish, and a rectangular platform was also encountered projecting from the inner side of the roundish corner. A sharp turning was noticed towards the eastern end of the wall. The remains of an entrance gate, and a few drains running from north to south as a part of this structure could be discerned besides it's another offshoot.

Period V

Represented by 0.70 m thick deposit, it yielded painted and moulded pottery decorated with naturalistic and geometric designs. A red ware sherd decorated with a 'Swan' flanked by an amorous couple on either side was of interest.

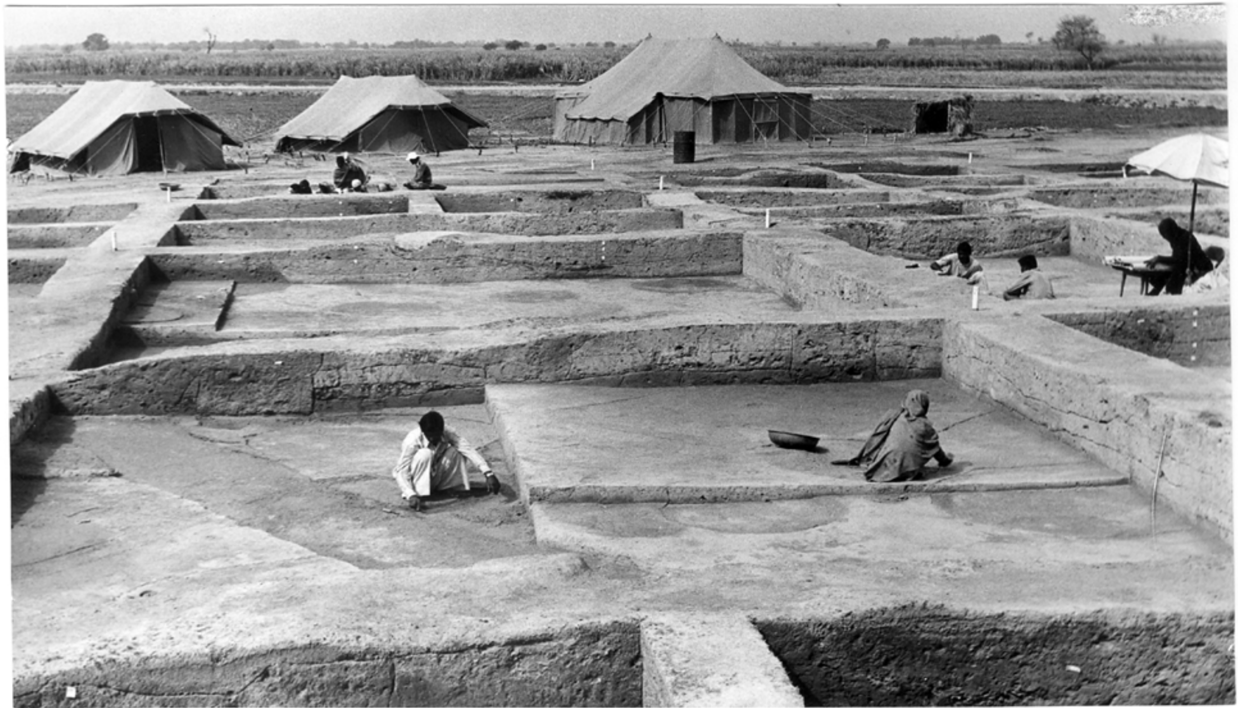
Pl. I. Hulas site as appears in Google Map



Pl. II. A view of ancient mound at Hulas



Pl. III. Excavated trenches at the site



Pl. IV. Harappan levels



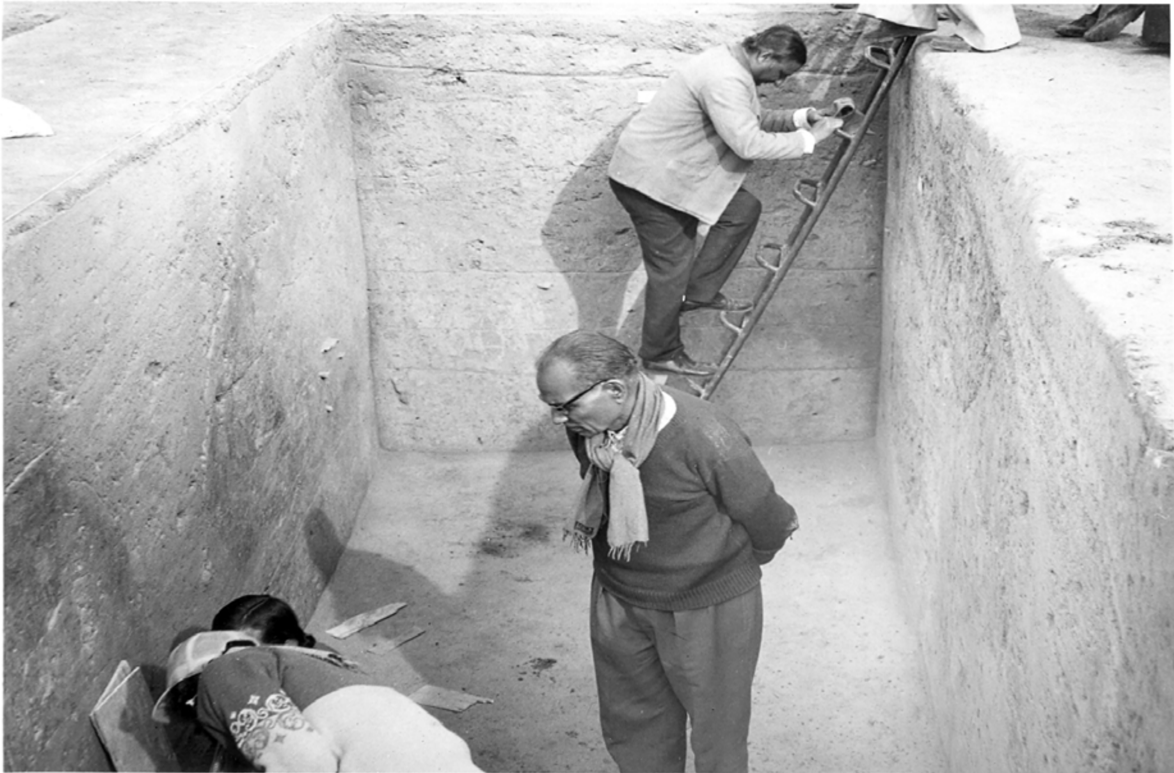
Pl. V. Pottery yard at the site



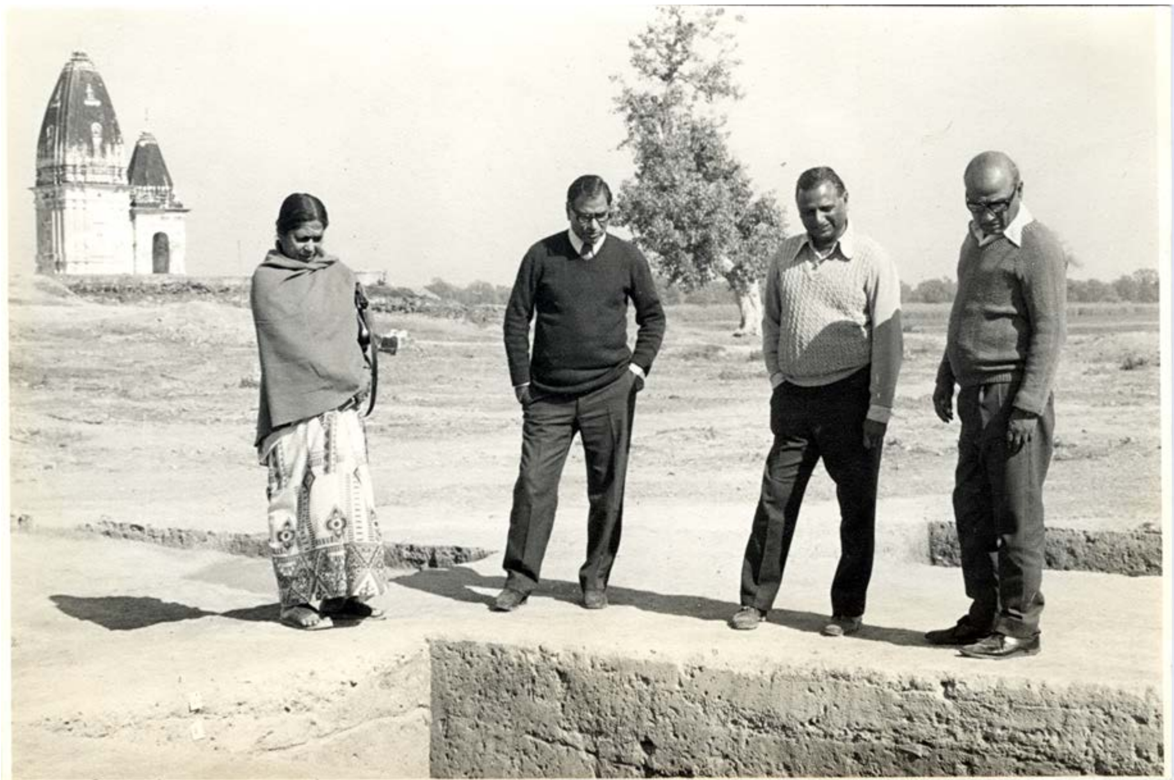
Pl. VI. Prof. B.B. Lal at the site



Pl. VII. Dr. Y.D. Sharma, Dr. S.P. Gupta and K.N. Dikshit at the site



Pl. VIII. Dr. Y.D. Sharma, Dr. Shashi Asthana and K.N. Dikshit in trench



Pl. IX. Smt. Debala Mitra, Shri B.K. Thapar, K.N. Dikshit and H. Sarkar during excavation



Pl. X. B.K. Thapar, Debala Mitra and H. Sarkar at the site



Pl. XI. B.K. Thapar and Debala Mitra at the site

CHAPTER - II

The Cutting and Stratigraphy

The main aim of the excavation was to ascertain the stratigraphy of the site and also to know the cultural details of the different periods and place them in a wider context. The mound rising about 5 m above the surface level measures about 330 m north-south and 172 m east-west, was selected for horizontal excavations. It was divided into the grid system of 10 m squares, making the centre point of the mound as focal point. In the first season of the work between 1978-79, the northernmost trench (ZA9, ZA8 and ZA7) were put up for excavation along with the main trench atop the mound covering the trenches from XC1 to XE1 to the highest point A2 and the other trenches XG5 to XA11 at the southern part of the mound.

The total area of the excavated mound was 4831.25 sq. m whereas the Harappan area measured 2783.35 sq. m, out of 45 trenches of 10 sq. m. Painted grey ware settlement area was 306.35 sq. m i.e. 8 trenches of 10 sq. m and Kushan and Gupta settlements including later ones which are concentrated mainly in the central area of the mound was 1741.55 sq. m confined to 31 trenches of 10 sq. m. These areas are demarcated on the site plan for understanding the settlement pattern at the ancient mound of Hulas **(Fig. 1)**.

The results of the initial stages of excavations (1978-79) confirmed that southern area of the mound was occupied by the Harappans, whereas in due course the northern end of the mound came into existence by the users of the Painted Grey Ware (PGW) which was quite away from Harappan settlement. This clearly means that the PGW folk used fresh land, a pattern followed in north India and noticed in exploration and excavation during 1950s and 1960s.

In order to understand the stratigraphy of the site, we concentrated our layout on the result of the excavated area and continued to focus in unearthing the details of Harappan settlements in the remaining years till 1983. While detailing the stratigraphy of the site, a section running north-south facing eastern side has been drawn. We are describing a few of the trenches which clarify the stratigraphy as well as the expansion of the second mound and settling of other later groups of people at the site **(Fig. 2)**.

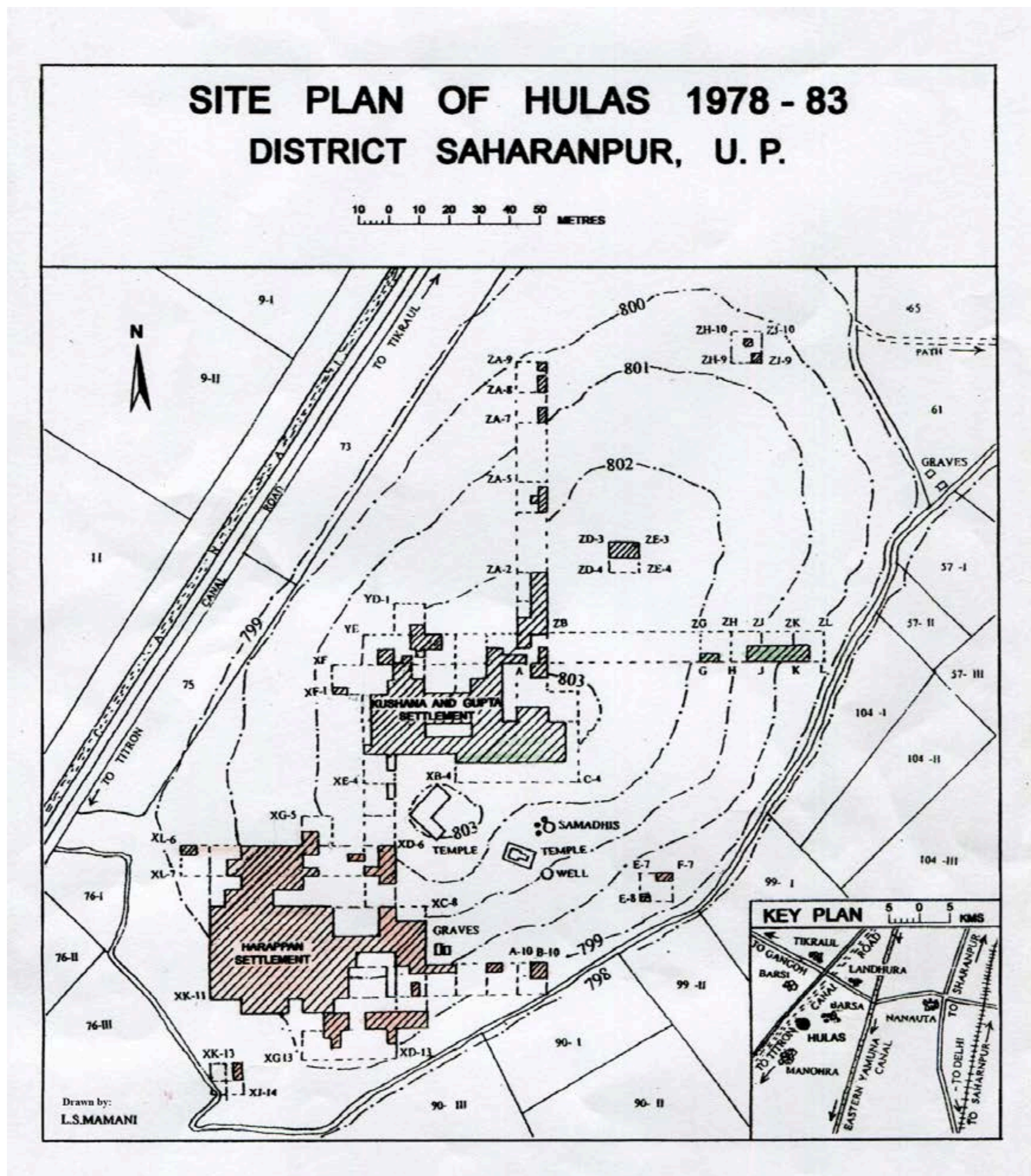


Fig.1. Site plan of Hulas

Hulas: 1978-83

Section from north to south facing east

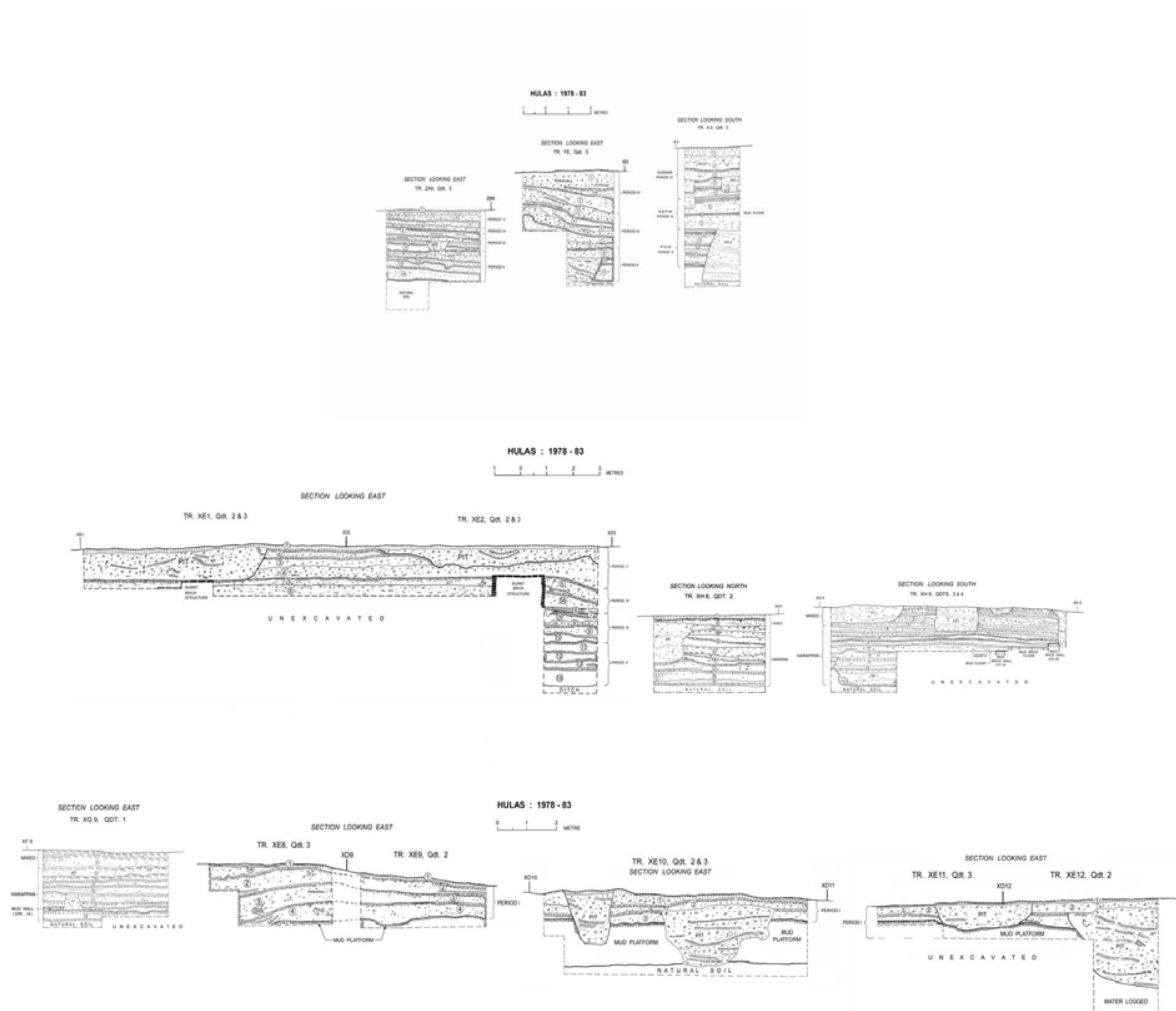


Fig.2. Sections looking east across trenches ZA9, YE, XE1 and XE2, XG9, XE8 and XE9, XE10, XE11 and XE12; sections looking south across trenches A2 and XH8 and section looking north across trench XH6

Trench ZA9

The layer (1) of the site which is loose and mixed revealed different potsherds yielding potteries of medieval, Sunga–Kushan and Gupta periods. The deposit of layers (2) and (3) which is also loose, contain ashes and mixed deposit continued. The layer (4) started showing only the material belonging to Sunga level and negligible material of upper

deposit like Guptas, whereas layer (5) revealed a floor level of Sunga–Kushan period but the composition of layers is compact in some areas, otherwise it has loose tendency of soil.

From layer (6) we started getting NBP associated red ware sherds and coarse Grey ware but again the layers show traces of ash and charcoal mixed with loose soil and debris. In layer (7) and (8) the same condition continued but no structural level was encountered. In layer (9) NBPW continued but PGW was also noticed. In layer (10), a floor level showing traces of occupational deposit with Painted Grey Ware and other associated red ware was noticed. The same situation continued in layers (11) and (12) but in layer (13) the presence of PGW was less, whereas handmade red ware sherds were found more in number. The layer was more compact than earlier one. In layer (14) which was merging with natural soil revealed a handful of PGW sherds, rolled red ware sherds and other handmade red ware vases which were affected by water. Below this level, was encountered the natural soil**.**

Trench YE

The section of the trench YE which is looking east reveals the same sequence of layers noticed in trench A2. However in this trench the formation of layers show a kind of sloping tendency from north to south. The materials noticed from different layers confirm the periodization of trench A2.

Trench A2, section looking south

The layers (1) and (2) are the mixed deposit of loose earth with brick-bats including potsherds of medieval and Gupta periods. The top of layer (3) witnessed a compact portion probably representing a floor, whereas the layer itself is loose and the material of this level belongs to Kushan period. Layers (4) and (5) having the deposit of compact earth mixed with loose soil is dominated by pits. The layer (6) at the bottom revealed a mud floor of loose earth demarcated as (6A) and layer (7) is also of loose earth. The layers (6), (6A) and (7) revealed NBPW, associated red ware, grey ware and other objects. The layers (8) to (12) are of compact earth and dominated by PGW and associated ware. There is a huge pit sealed by layer (7) cutting these layers and reaching down to the level of natural soil.

Trench XE1 and XE2

The layers (1) to (4) are cut by many pits and yielded mixed pottery with dominant red ware of medieval period. The layer (5) which is of loose earth and brick-bats represents Sunga-Kushan deposit as it revealed typical Sunga-Kushan red ware. Against layer (5) was encountered a massive brick structure sealed by layer (5) and partly by layer (4) at some parts of the section, as the layer (4) also yielded Gupta sherds. The nature of the layer

confirms the yellowish deposit. The layers (5) and (6) are comparatively compact in relation to above deposit. The sherds are rolled and weathered ones. From layer (7) to layer (10) sherds of grey ware associated with red ware are of NBP period and below this in layer (11), a few sherds with PGW with associated red ware were found. The deposit of layers (12) and (13) was waterlogged and most of the red ware sherds were rolled ones. The last layer (15) was difficult to excavate because of more muddy nature of the soil suggesting water logging and also giving an idea that the layers from (13) to (15) were a part of a ditch as in layer (15) rolled sherds were encountered profusely including the part of a dish-on-stand of the Harappan times. Being a ditch filled with water further probing could not be done in this trench.

Trench XH8

The section of the trench looking south revealed that the layer (1) and (2) was compact but blackish grey in appearance with Harappan sherds. Towards the left and also in the middle parts, we encountered grey ware sherds of upper periods. Burnt clods mixed with compact brownish and blackish earth was observed in layer (3) which was continuing to the centre of the layer. The layer (4) and (5) were exposed which revealed compact earth but was not continuing in the whole area as the corner of the trench the earth was loose. It revealed only Harappan material and two stone pebbles in the adjoining pit. The layer (6) was loose with burnt clods whereas (7) was also of loose earth but brownish in colour. The layers (8) and (9) were compact but layer (8) was a mud-brick wall and layer (9) running up to this wall was also found sealing a mud-brick floor, whereas layer (10) sealed a mud-brick wall, a hearth and mud floor. The plans of the structure were traced to their conclusive ends. The layers (10), (11) and (12) were also exposed at other corner of the trench to reach the natural soil. Both of these layers are loose and of brownish colour. The layers (13) and (14) were sticking against the soil due to a slope. Below this was found natural soil. The trench XH6 and XG9 being in Harappan area have more or less the same repetition in the material and section as XH8.

Trenches XE8, XE9, XE10, XE11 and XE12

The section of above trenches facing east revealed that from layers (1) and (4) Harappan deposit having circular huts and other mud structures sometimes containing mud-bricks and below them a mud platform was encountered sealed by layer (4) which is of compact earth whereas the above three layers are loose with more patches of compact earth

but were dominated by Harappan material. In order to understand the thickness of mud platform (described elsewhere) the natural soil was reached in trenches XE10 and XE12.

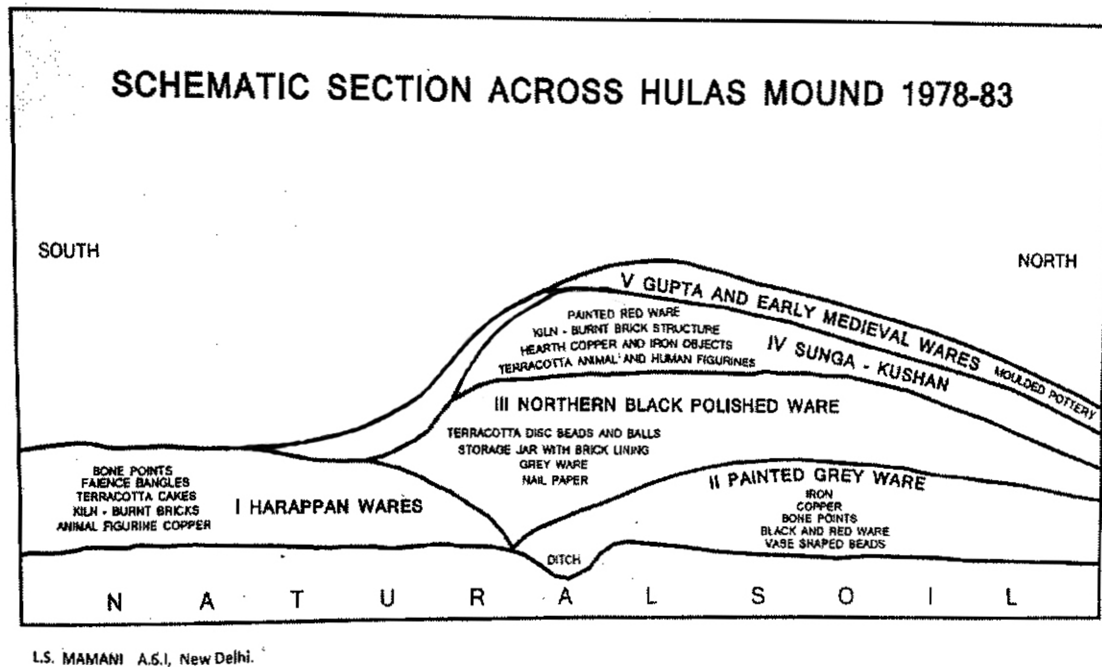


Fig.3. Schematic Section across Hulas Mound

The excavations at Hulas revealed that the successive PGW people did not occupy the Harappan mound and settled separately, but in due course while the movement of new migrants started, they went on occupying PGW settlement during NBP and successive cultures. A part of Harappan settlement was also thinly overlaid in early medieval period.

CHAPTER – III

Settlement Pattern: Structures

The excavations have revealed an extensive settlement of Harappan period. In an area of about 2000 sq. metres, having an average deposit of 2.40 metres, has yielded besides other cultural material, five structural levels. Out of these, three earliest levels belong to Harappan period and after a gap, the site was occupied in Kushan period. The last period is sealed by the construction of a wall of medieval period. Important structures have been dealt in detail.

Harappan Period (Pd I)

Out of the forty-three structures, five belong to the earliest phase, thirty two to the middle phase and rest to the upper phase of Harappa culture **(Fig.1)**. These are of four types viz., mud-brick structures, mud houses, circular huts and structures of wedge-shaped burnt bricks. The earliest phase is represented by a mud brick house complex, a rectangular house having the use of mud-bricks, drains cut into floors and three well furnished floors. In the second phase, it was noticed that the inhabitants did not use mud-bricks for construction of their houses, although there is not any occupational break in between. In this phase two types of structures came into light. First, the mud-walled houses and the second circular huts both were having the superstructures of wattle-and-daub. The structures of this phase were raised on the debris of the earlier structures. At this stage, it seems that the entire settlement was possibly divided into two sections by a long, thick mud-wall running from north-east to south-west measuring 17.20 m in length and 4.5 to 8.0 m in width. It is noteworthy that on the north-western side of this wall the structures were confined to only mud houses with a few exceptions of circular huts. Such type of compartmentalization in the settlement indicated that some sort of social stratification was prevailing at this stage in the society. This was further attested to by the presence of furnaces, although the copper objects inside a mud-walled structure identified as workshop (craftsman house) in the north-western block of the habitation was also found. In the last phase the mud-houses continued but the circular huts to the main structures were not found. For the first time we see wedge-shaped burnt bricks in use but that too in a restricted manner.

Notably, the structures of all these three phases (IA, IB and IC) were oriented from north-east to south-west **(Fig. 2)**.

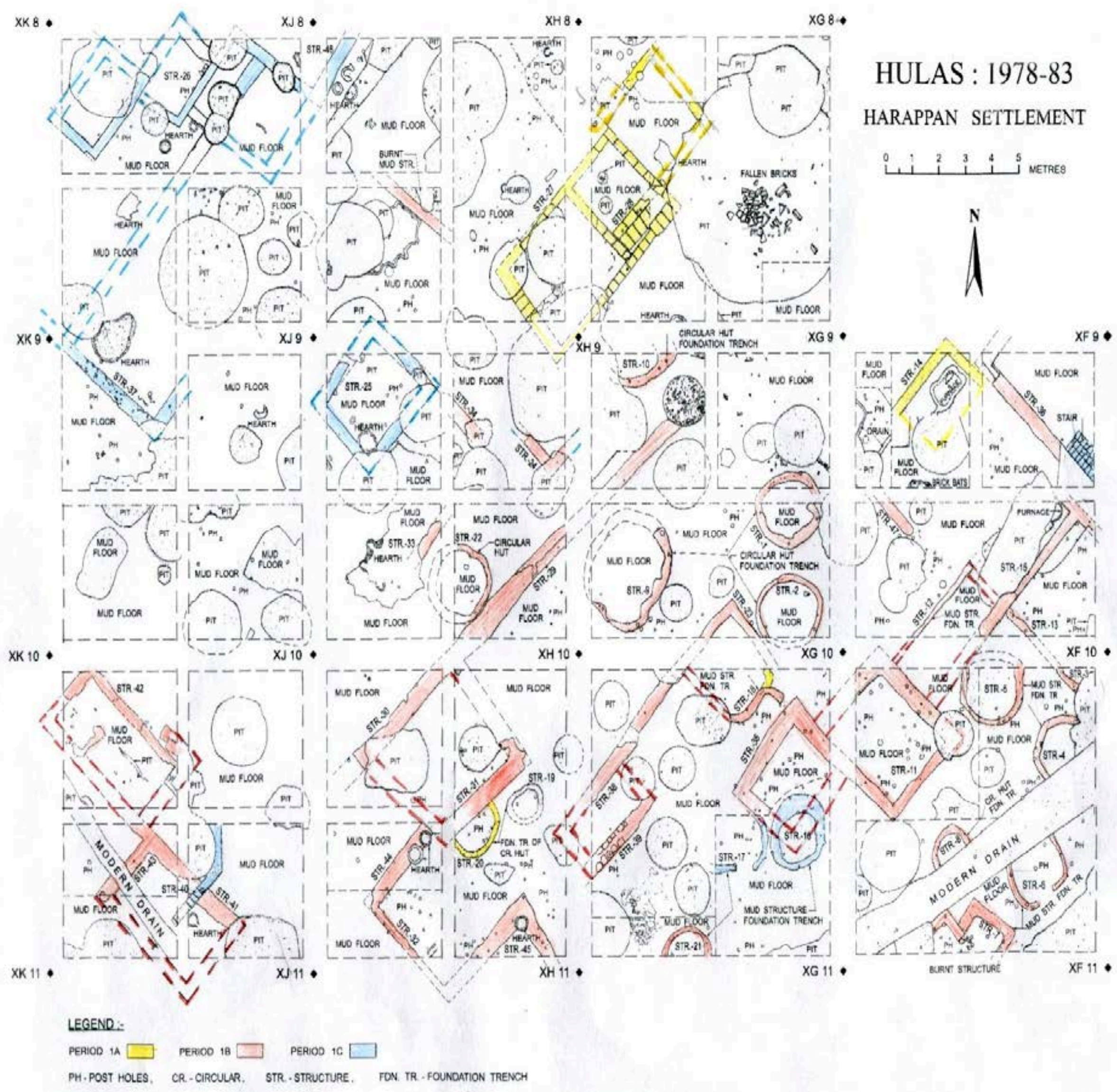


Fig.1. Harappan structures marked phase-wise in different colours

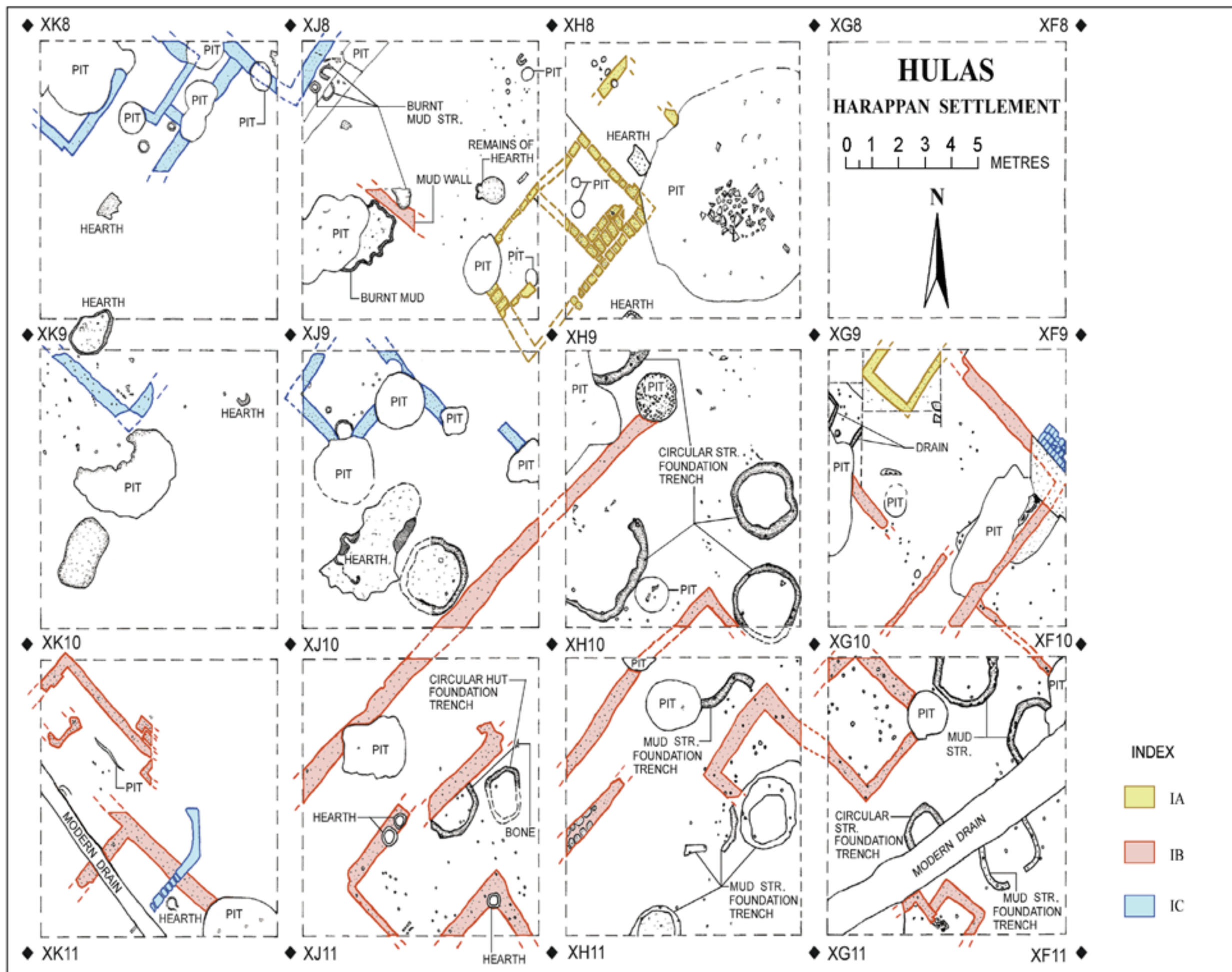


Fig.2. Harappan period (IA, IB and IC) structures oriented from north-east to south-west. Structures of phase IA are marked by dark yellow colour.

Phase IA (Figs.3 and 4; Pls. I – VI)

The Harappan settlement was confined to the south-western area of the present mound. The earliest settlement took place on the alluvial soil. As the natural soil was touched in an area of 150 sq. m only a few structures of the earliest phase were exposed. As mud-brick house complex, a mud-walled rectangular house and a few floors of rammed earth with traces of circular hearth, burnt earth, corn-bins and concentration of potsherds, in this level. The floors of the houses were made of rammed earth. Their variety comprised the floor made of rammed earth or clay and the floor made of burnt earth clods. The occurrence of post-holes on plan of floor indicates that the main thrust of the super-structure of the wattle and *daub* was on these wooden posts. The structural details are as following:

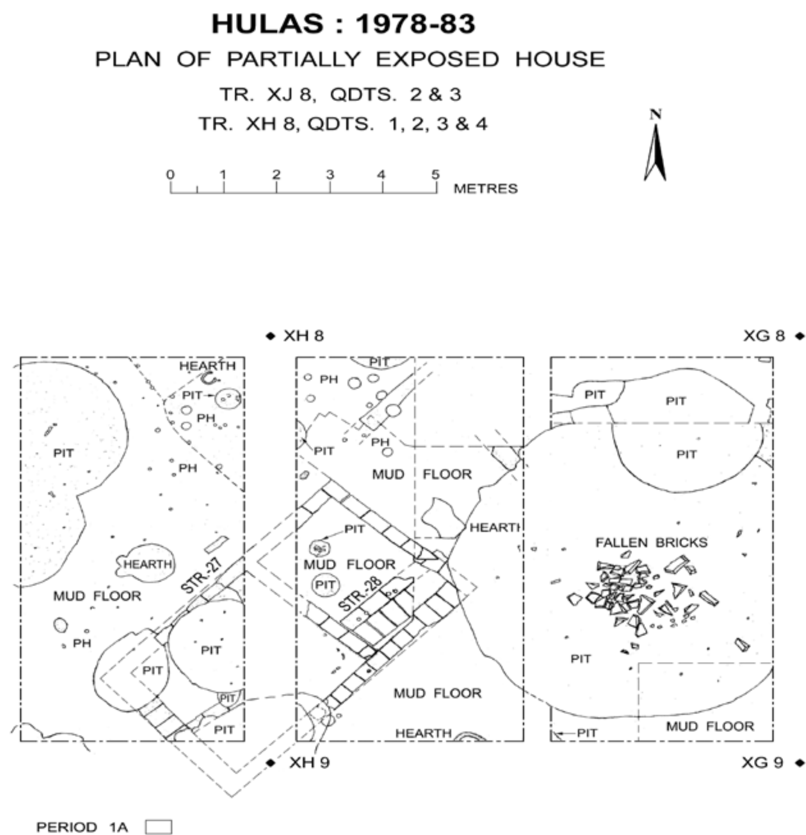


Fig.3. Plan showing excavated Harappan structures

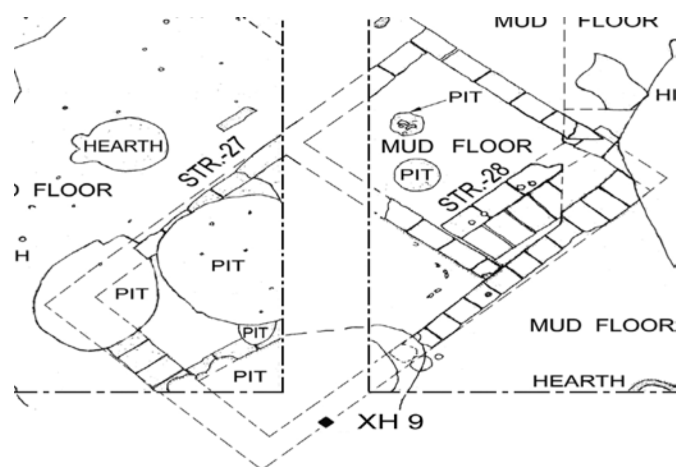


Fig.4. Plan showing specific excavated Harappan structures

1. Structures in Tr. XG9

(i) Floor

A finely prepared floor of about 0.15 m in thickeners with a number of post-holes ranging in diameter from 0.06 to 0.10 was exposed in the lowermost level. It was laid directly over the natural soil and was rammed by compact greyish clay. A double row of post-holes measuring 2.00 m in length was found aligned in north-west to south-east direction. It was possibly an extension or arm of house raised on wooden or bamboo posts. On plan, near the south-western corner over the floor was found a small burnt circular spot measuring 0.25 m in diameter. Three post-holes ranging in diameters 0.02 m to 0.03 m were noticed in this burnt patch. From this level a coiled copper ring, few faience beads, bangles and terracotta wheel were also recovered.

(ii) Drains

In the south-western area of the trench, on plan two small drains cut into the floor level were noticed. One of them which turned towards west measured 1.32 m in length, 0.08 m in width and 0.06 m in depth. The second one running in north east to south west direction measured 1.00 m in length, 0.11 m in width and 0.04 m in depth. Both the drains were emptying in a large pit probably used as refuse pit, on the south-western corner.

(iii) Portion of a mud-wall

On the eastern side of this floor, a wall like structure possibly a part of a room having the firing effect running in north-east to south-west direction was noticed. It measured 1.17 m in length and 0.35 m in width and was damaged by a pit. Its available extant height measured 0.07 m.

(iv) Mud-wall structure (STR49)

Over the debris of the earliest structures, was found a rectangular mud- walled house aligned in north-east to south-west direction. This house measured internally 2.42 m x 1.44 m. The thickness of its three walls numbered as 49A, 49B and 49C, measured 0.36 m, 0.29 m and 0.33 m respectively. The fourth one (49D) partly exposed on the north-eastern corner of the trench was found only 0.16 m in length. The faces of the wall (49A) were found burnt internally and externally. All these walls were made of compact yellowish clay. The eastern clods having burning effect were used in floor which was quite well rammed. As no post-holes were encountered in the area, as such nothing can be inferred about the nature of superstructure.

2. Structures in Tr. XH 8

(i) Floor

A floor level disturbed by a large pit was noticed in the lower level of Tr. XH 8. It seems to be contemporary of the rectangular mud house exposed in adjoining trench XG9, Qd.1. A large burnt area along with a mud-brick work (seems to be a part of a mud brick wall) was noticed on plan. Since a limited area was excavated, further details of this floor could not be worked out.

(ii) Mud-brick house complex (STRS-27 and 28), Tr. XH8, Qd.1, 4 and XJ 8, Qd.3:

A mud-brick house consisting of two rooms was exposed in the trench XH8 and partly in XJ8. It was oriented north-east to south-west direction and measured 6.35 m in length, 3.40 m in width and 0.28 m in height. Three courses of sun-dried bricks made of compact greyish clay were noticed in one of the walls of room. Mud mortar was used as binding material. The house was divided into two rooms with the help of a partition wall also built of mud-bricks. The room A in north eastern side measured 0.20 m. The bricks used in the construction of the room varied in size, 0.53 x 0.30 x 0.11 m; 0.50 x 0.30 x 0.10m; 0.52 x 0.28 x 0.10 m and 0.46 x 0.29 x 0.10 m. Beneath this room, the course of another structure of different brick size were noticed; 0.48 x 0.40 x 7m; 0. 83 x 0. 46 x 0.10 m and 0.49 x 0.46 x 10 m. The floor of this room was rammed by compact yellowish clay. It seems that the entrance was from the south-eastern side, as at this point in an area of 2.10 m x 0.85 m brick soling was done. The bricks were horizontally laid in two rows and measured 0.53 x 0.31 x 0.8 m; 0.52 x 0.35 x 0.8 m and 0.54 x 0.32 x 0.10 m. These bricks were laid in a fashion that the stretcher of the inner row was connecting the header of the bricks of the second row. Some post-holes were also noticed on the solid portion which indicated that they were possibly supporting the structure. At the north- western corner of the room, a storage jar and a corn-bin were noticed. Charred grains were also found in this area.

The room B lying in north western side measured internally 3.40 m x 2.00m. The walls of this room were found disturbed by three large pits. The bricks used in two walls (27 A and 27 C) measured 0.47 x 0.25x 0.7m, 0.48 x 0.23 x 0.08m, and 0.46 x 0.28 x 0.07m whereas in third wall (27B) sizes were 0.45 x 0.34 x 0.70m, and 0.45 x 0.34 x 0.07m. The floor of this room was almost cut by a large circular pit while the residue was found to be of well rammed earth.

In the north-eastern side of the house, rammed floor made of compact yellow earth was noticed. A few post-holes and an extant mud-wall were also noticed in this area. A big pebble possibly used as anvil was also recovered here.

3. Structures in Tr. XJ8

(i) Floor in Tr. XJ8, Qd.2 :

A large burnt floor measuring about 6 m x 5 m was exposed in the trench XJ8, Qd.2. The occurrence of post-holes in this area indirectly supported the existence of a thatched structure. A *chullah*, corn-bin, two circular hearths and possibly a silo were also noticed. Concentration of potsherds were also seen. The eastern portion of this floor was cut by a late circular pit. In the centre of this floor a 'U' shaped *chulah* with a widening of about 0.26 m was noticed. Its outer circumference was 1.02 m. A fragmentary arm joining the northern end of the *chullah* suggests that this was presumably compartmented by a central arm across the outer two arms internally. To the eastern side of *chullah* a circular silo having diameter of about 0.60 m was noticed. Its thin wall was plastered with lime which looked like a circle with yellow outline. To the north of this silo, a circular burnt mud-walled structure having a diameter of 0.67 m was noticed. The thickness of wall was not more than 0.03 m. Its exact purpose is not known but availability of charred grains suggested that it might have been used a cornbin. Two furnaces were also exposed on plan one to the south-east and another to the south of the *chullah.* The former was circular and exposed partly. The thickness of its wall measured 0.05 m. The other furnace, to the south of *chullah* was almost circular having two semicircular outward projections on its western side.

Nine post-holes with a diameter ranging from 0.06 m to 0.15 m were noticed. However they did not reveal any plan. A few plaster pieces with reed impression were also found in this area. The irregular post-holes suggested that possibly this area was used repeatedly.

HULAS : 1978-83

PLAN OF PARTIALLY EXPOSED HOUSES

0 1 2 3 4 5 METRES

TR. XJ 9, QDTS. 2, 3 & 4,
TR. XH 9, QDTS. 1, 2, 3 & 4,
TR. XG 9, QDTS. 1, 2, 3 & 4,
TR. XK 10, QDTS. 1, 2, 3 & 4,
TR. XJ 10, QDTS. 1, 2, 3 & 4,
TR. XH 10, QDTS. 1, 2, 3 & 4,
TR. XG 10, QDTS. 1, 2, 3 & 4

PERIOD 1B

Fig.5. Plan showing excavated Harappan structures

Phase IB (Fig.5; Pls. VII – XVI)

This phase revealed more structural activities than Phase IA. In this phase, thirty-two structures were exposed in a large area of about 2000 sq. meters. These structures gave a better idea of the settlement pattern of the inhabitants. The phase is marked with new changes in plan, and the material used for the living usages. For the first time, circular huts were introduced as the part of the mud-walled houses. Sporadic use of wedge-shaped burnt bricks was seen. An interesting feature noticed in of this phase is that the entire settlement was divided in two blocks by a thick mud-wall running in north-east to south-west direction. The available length with occasional gaps measured to be 17.20 m and 0.80 m to 0.45 m in width. To the north-eastern side of this wall, were confined only mud houses with different types of furnaces while on the other side mud houses were accompanied by circular huts. Such type of block pattern indicated a sort of division between the residential area and the working area of craftsmen.

Seventeen circular huts were exposed on plan in south-eastern sector. The huts were of varied patterns and of different size. The diameter of the smallest hut measured

1.50 m and the largest 3.20 m internally and 2.00 m to 3.75 m externally. For the construction of a circular hut, evidence has been found in the form of a circular foundation which was about 0.20 m to 0.40 m deep and 0.25 m to 0.45 m wide. Wooden or bamboo posts were set closely in these trenches. Remnants of post-holes were noticed at the bottom of the foundation trench. The reed impressed plastered walls of the huts were raised with the help of these posts. The pieces of the burnt plaster indicated that the reed frame was used thickly coated on either side with mud. It might have helped in stopping the rain water and air. The roofs having the support of the wooden posts were probably conical. The huts built close to each other do not reveal any set planning.

It has been noticed that the mud houses were constructed by two methods. In the first method, for the construction of a house, low mud-walls were raised and on them wooden or bamboo posts were inserted for supporting the thatched superstructure. In second method, the walls were perhaps raised upto the roof level as no post-holes were noticed on the walls.

The clay used for the construction of walls was of two types (i) yellow clay with *kankar* and (ii) compact greyish clay. In some cases for the construction of a wall two lumps of compact clay were found kept side by side in a row. In the houses, floors were made of well rammed yellowish or/greyish clay. For instance the floor in one of the house No. 11 was found finely plastered with clay overlain by cow dung plaster. Circular furnaces and corn-bins made of earth were also noticed inside some rooms. They were placed either at a corner or inner edge of the wall. Besides circular furnaces, a large oblong furnace in one corner of a house was noticed. In other house the mouth of a circular furnace was found projected like a lip.

1. Structures in Tr. XG9

(i) Mud house in Tr. XG9, Qd.1: (STR 14)

Two mud-walls of a room were exposed in Tr. XG9, Qd.1. The longer wall (STR 14A) measuring 1.75 m in length and 0.37 m in width was found running in north-east to south-west direction. The another wall measuring 1.05 m and 0.35 m in length and breadth respectively was running north-west to south-east direction and joined the other wall at its north-eastern corner. These walls with available height of 0.25 m were made of compact greyish clay. Inside the house, measuring 1.40 m north-east to south-

west and 0.93 m north-west to south-east, a large oblong furnace was noticed in the corner. No post-holes either inside or outside the room were noticed.

(ii) Mud-wall in Tr. XG9, Qd.2 : (STR 36)

In the adjoining quadrant of the above discussed structure, a thick mud wall, oriented in north-west to south east direction was noticed. Made of compact yellow clay mixed with small *kankar*, it measured 3.47 m in length and 0.48 m in width. Its exposed height measured 0.05 m. Although the orientation of this wall and above described wall 14B were same but not in the same alignment. So it is very difficult to say that whether it belonged to the mud- walled house exposed in Tr. XG9, Qd.1 or was an arm of another house. Perhaps it belonged to another house closely set with the former. A few post-holes were also noticed on the south-western side of this wall.

(iii) Mud-house in Tr. XG9, Qd.3. (STR 15)

Two mud-walls of a house complex were exposed in the trench XG9, Qd.3. These walls were made of compact yellow clay mixed with *kankars*. Of these two walls, the shorter one (wall 15B) running in north-west to south-east direction measured 1.65 m in length and its extant height was 0.15 m. Its extension on either side could not be traced. It was joined at its half length, at right angle by a longer wall (STR15A) oriented in north-east to south-west direction. Its length and width measured 3.54 m and 0.36 m respectively with extant height of 0.15 m. This wall (STR15A) appears to have served as a partition wall between two rooms of a large house because on either side of this wall rammed floor levels were noticed. The floor on the western side was found damaged by a large pit containing the remains of a circular burnt furnace on the eastern corner. The furnace which measured 0.68 m was cut by the pit. The floor on the south-eastern side of the wall was made of well rammed greyish clay. On plan along with the partition wall a burnt earth patch measuring 2.28 m by 0.48 m accompanied by a few post-holes was noticed. From this area terracotta and faience beads, a stone ball and a copper ring were recovered.

2. Structures in Tr. XG10

(i) Mud-house in Tr. XG10, Qd.1 : (STR 11)

A good preserved plan of a rectangular mud-house was exposed in quadrant 1 of XG10. Of its four walls; two completely and two partly were exposed. This house measured internally 3.30 x 2.80 m. The longer axis of this house was found oriented from north-west to south-east direction. The width of walls varied from 0.34 m to 0.65 m. The walls were made of compact grey clay. Few post-holes noticed on the wall

suggested that this house was raised on low mud-walls and the superstructure was supported by wooden posts. This floor of the house which was made of rammed grey clay was also coated with cow-dung. Towards the western corner of the floor, some burnt earth patches were also noticed. Numerous post-holes were noticed on plan.

A post-hole approximately in the centre of the floor measuring 0.20 m in diameter possibly was meant for central pillar to support the main beam. Outside this house in south-eastern area a stone muller and patches of plaster were noticed.

(ii) Circular hut (STR 5) in Tr, XG10, Qds. 1 and 2

To the east of the mud rectangular house (STR No.11) a circular structure (STR No.5) was noticed. This was constructed after laying a foundation trench about 0.15 to 0.20 m in width with a depth of about 0.20 m. Thereafter wooden posts were placed in the foundation trench and the inner area was covered with wattle and *daub*. The area (Tr. 2) covered by the inside floor and the hut was measured 3.90 m^2 and 4.70 m^2 respectively. The foundation trench was found filled up with loose carbonic material. At the bottom a few post-holes were noticed. The carbonic material along with post-holes in the channel like foundation suggested the burning activities. The floor was made of rammed yellow clay. On the eastern side fire activity was noticed. The entrance of the hut could not be located.

(iii) Circular hut (STR 4) in Tr. XG.10, Qd.2

To the south east of the (STR-5) a similar structure was exposed. It was found disturbed by a large pit and a drain. The area of the floor measured approximately 3m^2 and of the outer periphery of the hut 4.50 m^2. The foundation trench, which was filled up with carbonic material was to 0.20 to 0.30 m in width and measured 0.20 to 0.25 m in depth. A few post-holes were noticed at the bottom of the foundation trench. At one place four post-holes were seen very closely. The floor prepared of fine yellowish clay was well rammed. In the north-western side of the floor a burnt patch was found.

(iv) Circular hut (STR 3)

To the north of STR 4, another circular hut (STR 3) was noticed. It was cut by a pit. Its foundation trench with floor was partly exposed in Trench XG10 Qd.2 and partly in Tr. XG9 Qd.3 (STR 13). The width of the foundation trench measured 0.20 to 0.27 m.

(v) Circular hut (STR 6) in Tr. XG10, Qd.3

To the south of STR 4 another circular hut was exposed. It has an opening on the south-east direction. The rear portion of the hut was cut by a long rain gulley. The area of the extant portion of floor was measured approximately 3m^2. It was 200 x 150 m. The width of the foundation trench ranges from 0.10 m to 0.10 m. Six post-holes were noticed at the bottom of the foundation trench suggesting that the wall was raised on the bamboo or wooden posts. One post was set at some distance from other. The foundation trench was filled up with loose carbonic substances. A few post-holes were also noticed outside the hut. The entrance on the south-eastern side was 0.70 m wide. The floor was found well rammed and made of greyish clay. A few post-holes and burnt earth patches were also noticed.

(vi) Rectangular structure (STR 7) in Tr. XG10. Qd.3

A rectangular hut (STR 7) was also exposed in the south western side of STR 6, in Tr. XG10, Qd.3. The exposed area of the hut measured internally 1.40 x 1.20 m. The width of the rectangular foundation Trench ranges 0.30 m to 0.40 m. A few post-holes noticed within the foundation trench suggested that the superstructure was raised on wooden or bamboo posts. The floor was made of well rammed compact grey clay. Numerous post-holes and a 'U' shaped *chullah* like structure were also traced on plan. The *chullah* was made of grey clay but no burning effect was noticed on its wall. Three post-holes were noticed on the wall of this *chullah.*

(vii) Circular hut (STR 8) in Tr. XG10 Qd.3

To the northern side of the rain gulley a circular structure (STR 8) was exposed. Its southern half was cut by the gulley. The extant area of the hut was measured 1.15 m^2 internally and m^2 externally. The width of the foundation trench ranges 0.15 m to 0.30 m. The foundation trench, which looks like a circular channel contained loose carbonic material ash, charcoal etc. The smaller size of this hut suggested that it might have been used for storage purpose, i.e. for fodder etc.

3. Structures in Tr. XH9

(i) Circular hut in Tr. XH9 Qd.1

A portion of a circular hut (STR 10) was exposed in Tr. XH9 Qd.1. It was partly cut by a large pit. The foundation trench of this structure ranges 0.25 m to 0.68 m in width. It was 0.20 m deep and filled with loose carbonic material. A few post holes were

also noticed within the foundation trench suggesting that the superstructure made of wattle and daub was supported on wooden posts.

(ii) Circular hut (STR 1) in Tr. XH9 Qd.2 and 3

A well preserved plan of a circular hut (STR 1) was exposed partly in Qd. 2 and partly in Qd.1of Tr. XH9. This structure revealed a fairly good picture of a circular hut made of wattle and *daub*. The diameter of the hut measured 2.05 m internally. Thus area covered by the hut measured 3.30 m^2 internally and 5 m. externally. The width of the foundation trench, which was found, filled up with loose carbonic materials, ranges 0.30 m to 0.40 m. Its depth was measured 0.20 to 0.25 m. At the bottom of the foundation trench post-holes were noticed. These suggested that the walls were raised on the wooden or bamboo posts with the help of reed screen. The floor was of rammed yellow clay. A few post-holes were also found in surrounding area. To the north of the hut numerous miniature pots were noticed on a floor. Seven pots covered with lids were seen set in a row.

(iii) Circular hut (STR 2) in Tr. XH9 Qd.3

A circular/overlaid hut (STR-2) was exposed to the south of circular hut (STR1) in Tr. XH9, Qd.3. The diameter of the hut measured 2.20 m internally and 2.52 m externally. Thus the area (STR2) covered by the hut was measured 3.80 m^2 internally and 5 m^2 externally. The width of the foundation trench which was filled up with loose carbonic material measured 0.15 m to 0.20 m and the depth 0.30 m. The post-holes were also noticed at the bottom of the foundation trench. The living floor was made with rammed yellow clay. In the northern portion of the floor burnt earth patches were also noticed suggesting that there might have been a fire place. To the east of this burnt spot a broken wedge-shaped burnt brick with frog marks was noticed. A few bone pieces and post-holes were found in the area outside of the hut.

(iv) Circular hut (STR 9) in Tr. XH9, Qd.3

A large circular hut (STR 9) was exposed in Tr. XH9 Qd.4. This structure largest among the circular huts was measured 3.50 m in diameter. An average area covered by the hut was measured 9 m^2 internally and 12.50 m^2 externally. The width of the foundation trench ranges 0.25 m to 0.45 m and its depth measured as 0.30 m. Numerous post-holes were noticed inside of the foundation trench suggesting that the wall was raised on wooden-post with reed screen. A few plaster pieces with reed impression obtained from the adjoining area suggested that the wall was plastered with mud on either side. The floor of the hut was found burnt. It was made of well rammed

clay. The charred bones were also notice scattered on the floor level. The area outside the hut was also found rammed with compact mud. Outside this hut in south-eastern area a small pit having a diameter of 1.20 m was noticed. Yielding numerous bones of animals presumably it served as refuse pit.

(v) Mud wall (STR 20) in Tr. XH9, Qd.3 and 4

To the south-east of the large circular hut (STR-9) two arms of a mud edifice were exposed. This structure was also oriented in north-east to south-east direction. Of its two walls, wall 23A measured 1.62 m and 0.32 m and wall 23B 1.90 m and 0.36 m in length and width respectively. Its height was 0.10 m. Wall 23A running in north-west to south-east direction joined wall 23B running in north-east to south-west, at right angle. Thus these walls were forming a northern corner of a house. No post-holes were noticed in this area. The walls of the house were made of compact yellow mud mixed with small *kankars*. The floor was prepared with greyish mud.

4. Structures in Tr. XH.10

(i) Mud walls (STR 33A, B) in Qd.1 of XH10

Two mud walls numbered 33A and 33B were exposed in Tr. XH10. Qd.1. These walls aligned in north-east to south-west direction, seem to be an arm of a large mud-house. These walls were made of compact yellow mud mixed with *kankar*. Wall 38A measured 2.61 m in length and 0.40 m in width and wall 38B in the same alignment measured 0.03 m and 0.42 m in length and width respectively. These were exposed upto a height of 0.05 m. An opening measuring 0.50 m was noticed in between these two walls suggested that this might have served as front on of a house with an entrance from south-east. The adjoining area on either side of the wall was well rammed.

(ii) Mud wall (STR 39) in Tr. XH10, Qd.4

To the south-west of the structure 38 another wall running north-east to south-west was exposed in Tr. XH10, Qd.4. It was running parallel to the STR 38. This wall measured 3.42 m in length and 0.43 m in width. It was interesting wall showing the mode of construction. For the construction of this wall two compact grey clay lumps were set up side by side. These were again finished by the same mud mortar. Both the faces of the wall were plastered uniformly.

(iii) Mud-house (STR 35) in Tr. XH10, Qd.2

A rectangular mud-house (STR 35) was partly exposed in Tr. XH10, Qd.2. The exposed dimension of the house measured externally 3.90 m x 1.80 m. Its three walls numbered as 35A, 35B and 35C were exposed on plan. These walls were measured 1.05 m, 3.90 m and 1.80 m in length respectively. The width of the walls ranged 0.45 m to 0.55 m and extant height measured 0.10 m. Fourth wall of this structure could not be traced because it was damaged by a large pit. This house was oriented in north-east to south-west direction. A few post-holes were noticed on wall and inside floor of the house suggesting that this house was raised on low walls with the help of wooden posts. The floor was of compact grey clay. The area outside the house was also rammed. Many post-holes were noticed in this area.

(iv) Circular hut (STR 18) Tr. XH10, Qd.2

A portion of a circular hut was exposed in Tr. XH10, Qd.2 to the north of the mud-house (STR 35). This structure was damaged by a pit. The length of its foundation trench measured 2.52 m with a width ranging 0.20 m to 0.25 m. The foundation trench filled with loose carbonic material had traces of post-holes at its bottom. These post-holes suggested that this hut had also superstructure made of wattle and *daub*. The living floor inside was made of rammed greyish earth. The exposed floor level with foundation trench indicates it to be a medium size hut having a diameter of 3 to 4 m.

(v) Circular hut (STR 16) in Tr. XH10, Qd.3

A complete plan of circular hut with a foundation trench to raise the superstructure was exposed in Tr. XH10, Qd.3. The inner and outer diameter of this hut measured was 1.50 m and 2.40 m respectively. Thus the area covered by the inner floor was calculated 1.90 m^2 and the area covered by the hut was measured 4.50 m^2. The width of its foundation trench ranges 0.20 to 0.60 m. A few post-holes ranging in diameter 0.06 to 0.13 m were noticed within the foundation trench. The foundation trench contained loose carbonic material. The floor showing burnt earth patches was of well rammed yellowish clay. Because of its small dimension this structure was probably used for storage purpose.

(vi) Circular hut (STR 17) in Tr. XH10. Qd.3

To the west of STR 16 a portion of another circular hut was exposed in Tr. HX10, Qd.3. These two structures were closely set up. This hut had an opening from south-eastern side as indicated by the foundation trench. The average diameter of this partly exposed hut measured about 2.00 m internally. The foundation trench filled up with

loose carbonic material had a width ranging from 0.15 m to 0.30 m. Many post-holes were noticed on floor and within the foundation trench suggesting the structure to be of wattle and *daub*. The floor was made of rammed greyish earth.

(vii) Circular hut (STR 21) in Tr. XH10, Qd.4

Nearly a half portion of a circular hut was exposed at south-eastern corner of the Tr. XH10 Qd.3. The diameter of the hut was measured internally 1.40 m and externally 1.85 m. The width of the foundation trench ranged 0.10 to 0.20 m and a depth of 0.20 m. A few post-holes were also noticed at the bottom of foundation trench. The foundation trench was found containing loose carbonic material. It seems that the walls were raised with help of wooden posts and reed screen. The floor was well rammed and made of greyish mud whereas on the exposed area of the floor only one post-hole was noticed.

5. Structures in Tr. XJ8

Floor in Tr. XJ.8 Qd.1

A well finished burnt floor was exposed in layer (5) of XJ8, Qd.1 B.S. 0.88 m. This floor level was sealed by layer (4) seems to be of a rectangular hut built of wattle and *daub*. On plan numerous post-holes were noticed but interesting were those set in two rows meeting roughly at right angle. A series of closely set post-holes aligned in a row, oriented north-east to south-west measured 1.50 m in length. The second row of post-holes aligned in north-west to south-east direction was measured 2.10 m in length. The floor inside of these series of post-holes was burnt and made of compact mud. Burnt earth patches were also noticed. Towards the north-eastern corner of the trench a circular slip plastered with lime was noticed. Its diameter was measured 0.48 m and the wall was not more than 0.01 m thick. To the north-west of this silo a circular burnt earth structure measuring internally 0.20 m in diameter was noticed. The thickness of its wall was measured 0.03 m. To the south-west of the silo two large post-holes measuring 0.20 m in diameter were noticed set closed. The outer area of the hut was also rammed with numerous post-holes dotted on plan.

6. Structures in Tr. XJ9

(i) Portion of a mud wall (STR 33) in Tr. XJ9, Qd.4

A fragmentary mud-wall (STR 33) was exposed at north-eastern corner of Tr. XJ9. This wall damaged by a pit oriented in north-east to south-west direction, measured

1.30 m in length and 0.38 m in width with an extant height of 0.10m. It was made of yellow compact clay. To the south-west of this wall a large furnace was also exposed.

(ii) Mud walls (STRS 34, 24 and 24A) in Tr. XJ9, Qd.2

Three fragmentary mud-walls were exposed in Tr. XJ9, Qd.2. These walls seem to be of a large mud-house complex. However, these did not suggest any regular plan because the whole trench was disturbed by numerous pits. Among these three walls STR 34 exposed in the western half of the trench, measured 0.96 m in length and 0.49 m in width with an extant height of 0.10 m. this was made of yellow compact clay. To the east of this wall two other walls numbered as 24 and 24A were exposed. The wall 24, running in north-west to south-east direction measured 1.13 m in length and 0.30 to 0.40 m in width with an extant height of 0.10 m. to the east of this wall, wall 24A, running north-east to south-west direction was noticed. Its extant length was 0.30 m. It seems to have had joined wall STR 24 at right angle forming corner of a room. However the exact nature of the structure could not be ascertained.

(iii) Circular hut (STR 22) in Tr. XJ9, Qd.3

A portion of a circular hut with post-holes and foundation trench containing loose carbonic material was exposed in Tr. XJ9, Qd.3 in the north-western side of the massive partition wall. The diameter of the exposed area of the hut measured 1.95 m internally and about 2.55 m externally with foundation trench. The available circumference measured 4.40 m externally. The exposed portion seems to be nearly half of the compact hut. Thus the hut was of medium size. The foundation trench dug up to set the wooden posts varies in width 0.17 m to 0.30 m. Its depth measured 0.30 m and found filled up with loose carbonic material. A few post-holes were noticed inside of the foundation trench to fix the wooden/bamboo posts. The inside floor was finely prepared with rammed yellow earth. A few post-holes were also noticed on plan presumably to hold the thrust of superstructure made of wattle and *daub*.

7. Structures in Tr. XJ10

(i) Mud wall (STR 31) in Tr. XJ10, Qd.2 and 3

A thick mud-wall oriented in north-east to south-west direction was exposed in Tr. XK10, Qd.2. This wall made of yellow compact clay measured 3.40 m in length and 0.64 m in width. The fallen patches of mud in the north-eastern end of this wall suggested that this might have been joined by another mud-wall oriented in south-east to north-west direction. However its further extension could not be traced.

(ii) Portion of a circular hut (STR 19) in Tr. XJ10, Qd.2

To the east of the mud-wall (STR 31) a portion of a circular hut was exposed. The inner diameter of the hut measured about 1.00 m. The width of foundation trench filled up with loose carbonic material ranges from 0.20 to 0.25 m. The floor made of rammed earth showed burning patches at places.

(iii) Portion of a circular hut (STR 20) in Tr. XJ10, Qd.3

A portion of a circular hut with a foundation trench was also exposed in quadrant 3 of Tr. XJ10, to the west of circular hut (STR 19). The diameter of this hut measured 1.65 m internally and 2.10 m externally (with foundation trench). The width of the foundation trench ranged from 0.20 m to 0.25 m. It was found filled up with loose carbonic material. Possibly this carbonic material represented the decayed reed and wooden posts, suggesting that the hut to be made of wattle and *daub*.

(iv) Mud-house (STR No. 45) in Tr. XJ10, Qd.3

Two walls of a mud-house forming the northern corner of a room were exposed in Tr. XJ10, Qd.3. The longer arm (wall 45A) of the room oriented in north-east to south-west direction was measured 2.85 m in length and 0.56 m in width with an exposed height of 0.02 m. The north-eastern end of this wall (45A), was joined by a another wall (45B) at right angle, running in north-west to south-east direction. The latter measured 2.39 m in length, 0.46 m in width and was exposed upto a height of 0.02 m. Thus, it seems that this house was also oriented in north-east to south-west direction. Numerous post-holes were noticed both inside and outside of the walls, suggesting that the superstructure was supported on wooden or bamboo posts. The walls were made of compact grey mud. The floor was well rammed having traces of ashy loose earth. The area outside of the hut was also rammed. On this area patches of ash, loose earth were noticed. An interesting feature noticed was that within of the house a burnt earth circular structure was placed at the junction of these two walls, measuring internally 0.34 m in diameter. The width of its wall was measured 0.07 to 0.09 m with an exposed height of 0.05 m. Inside the structure compact clay lumps with loose ashy material were noticed.

(v) Mud-house (STRS 32 and 44) in Tr. XJ10, Qd.4

To the west of mud-house (STR 45), another mud-house was exposed in Tr. XJ8, Qd.4. Two walls of this house numbered as STR 32 and STR44 were exposed on plan. Wall 32, oriented in north-west to south-east direction measured 2.30 m in length and 0.25 m in width. It was made of fine grey mud. Towards its south-eastern end four

bricks-on-edge were noticed. At the south-eastern end it was joined at right angle by wall 44, oriented in south-west to north-east direction. The latter measured 2.87 m in length and 0.54 m in width with an extant height of 0.10 m. Two circular structures made of burnt earth were noticed, set closely on the inner edge of this wall. Whether these were used as corn-bin or furnaces cannot be discerned. Among these circular structures the south-western structure was measured internally 0.39 m in diameter. The width of its wall measured 0.10 m with an exposed height of 0.06 m. the second circular structure to the north-east of the former had a diameter of 0.31 internally and 0.46 m externally. The width of its wall measured 0.06 to 0.08 m with an extant height of 0.08 m. Its floor was made of greyish rammed clay. A few post-holes noticed on the wall 32 and inside and outside area of it, suggested that the house was raised on dwarf mud walls with the help of wooden posts. The area outside the house was also well rammed. In this level for the first time presence of wedge-shaped burnt bricks with frog marks were noticed.

8. Structures in Tr. XK10

(i) Mud-house complex (STR 42) in Tr. XK10, Qd.1

A large mud-house complex (STR 42) was exposed in Tr. XK10, Qd.1. In this trench ten walls belonging to different structures of the same level were exposed. Of these ten walls, three walls numbered as 42A, 42B, and 42C belonged to a large rectangular room, oriented in north-west to south-east direction. Of this large room, a wall (42A), measuring 1.22 m in length and 0.32 m in width and oriented in south-west to north-east direction had a rectangular projection from inner side. At the north eastern end, it was joined by another wall (42B) at right angle. The latter oriented in north-west to south-east was measured 1.20 m in length and 0.35 m in width with an extant height of 0.05 m. In the same alignment another wall 42C (possibly extension of wall 42B) was noticed after a gap of about 1.30 m. This gap might have served as entrance to the room. This wall 42C (measured 1.70 m in length and 0.34 m in width an extant height of 0.08m. These walls were built of compact grey mud. To the north eastern side of this wall (42C) two fragmentary walls were noticed. These walls numbered as 42D and 42E, oriented in north-west to south-east direction were measured 0.59 m x 0.46 m and 0.43 m x 0.31 m in length and width respectively. The wall 42D had a black end. These walls also made of greyish compact mud seem to be part of another house. The wall 42C of the large room was further joined by a small wall (42F) at right angle. This wall (42F), measuring 0.64 m in length and 0.22 m width with an extant height of 0.04 was oriented in north-east to south-west direction. This wall was further joined by a thin wall (42G) at right angle at its south-western end. The thin

wall (42G), oriented in north-west to south-east direction was measured 0.60 m in length and 0.17 m in width with an extant height of 0.05 m. Two walls 42F and 42G were forming a corner of a rectangular pit filled up with loose burnt material. Within the room, formed by the walls 42A, 42B and 42F, a structure consisting of three walls, seems to be a portion of a small rectangular room, was noticed. Of its three walls numbered as 42H, 42D and 42J, the wall 42I measuring 1.13 m in length and 0.21 m in width was oriented in north-east to south-west direction. It was further connected by two walls 42H and 42J from north-western side at right angle on either end. The wall 42H, joining the north eastern end of wall 42I, at right angle, measuring 0.49 m in length and 0.41 m in width was oriented in south-east to north-west direction. The other wall 42J joining the south-western end of wall 42I, measuring 0.51 m in length and 0.21 m in width was also oriented in the same direction. In this compartment formed by these three walls numerous burnt earth clods were noticed. In the south-eastern area of this structure and to the south-west of wall 42c, a thin walled burnt earth structure, measuring 1.55 m in length and 0.07 m in width, oriented in north-west to south-east direction, was also noticed. Close to this burnt earth structure in south western area, a stone possibly used as a sharpener, a few circular terracotta cakes, two cones like terracotta objects, and a bruised stone were lying on the floor level. From the same level one copper bangle and one copper needle with a circular eye were also recovered. The floor on which these objects were lying was made of well rammed greyish mud. A survey of the objects *in situ* suggested that this very house could be a workshop of a craftsman.

(ii) Mud-house complex (STR 41 and 42) in Tr. XK10

Three walls of a mud-house complex were exposed in Tr. XK10 Qd.3 and 4. The longer wall partly exposed in XK10 Qd.4 and partly in XK10 Qd.3 (numbered as STR 43A) in Qd.4 and STR 41 in Qd.3) measuring 4.00 m in length and 0.56 m in width with an extant height of 0.10 m. It was running in north-west to south-east direction.

The north-western end of this wall (STR 43A) was joined by another wall (43B) at right angle, oriented in north-east to south-west. It was cut by a modern irrigation canal. This wall (STR 43B) was measured 2.50 m. in length and 0.42 m in width. This wall seems to have served as a partition between two rooms of a house because at the junction of wall 43A and 43B a third wall (43C) was noticed joining the wall 42B at right angle. It aligned in north-western south-east direction was measured 0.80 m in length and a 0.44 m in width. These walls 43C and 43B were forming the other room of a house. The mud used for the construction of these walls was compact and looking grey.

The floor was made of rammed grey earth. On plan burnt earth patches were also noticed. In the room in south-eastern side a burnt earth circular furnace with a lip on south-eastern side was noticed. This furnace had a diameter of 0.35 m internally with 0.05 m thick burnt earth wall. The extant height of the wall measured 0.10 m. It seems this furnace was meant for metal smelting.

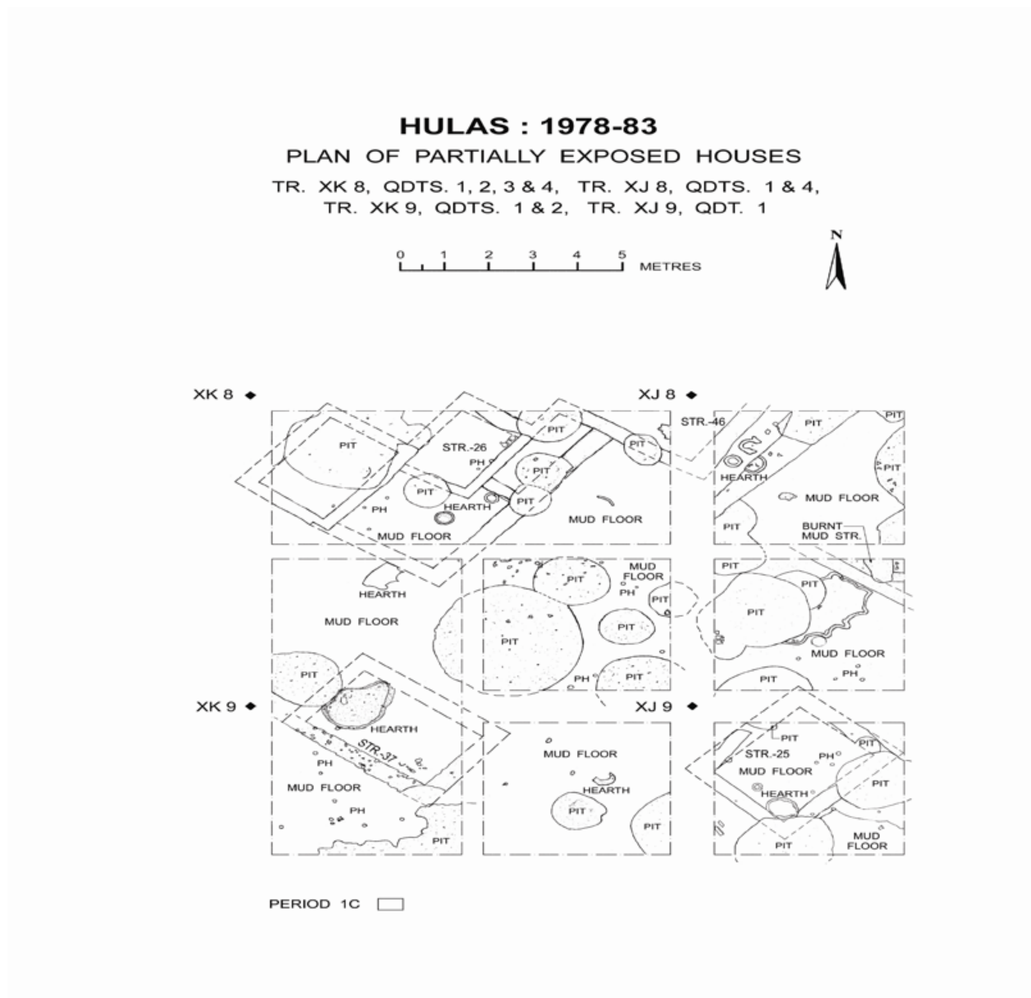


Fig.6. Plan showing excavated Harappan structures

Phase IC (Fig.6; Pls. XVII – XXVI)

1. Structures in Tr. XJ8, Qd.1

(i) Mud-house Tr. XJ9, Qd.1

A rectangular mud-house consisting of four walls was exposed in the upper level of Tr. XJ9, Qd.1. The house oriented in north-east to south-west direction measured internally 3.00 m x 2.35 m and 3.90 m to 3.10 m externally. The width of the walls of this structure vary from 0.37 m to 0.48 m and the extant height of the walls measured 0.10 m. yellow compact clay was used in the construction of the wall. The floor of the room was made of compact grey clay showing burnt patches at places. At the southern corner of the room a burnt earth, circular furnace (or corn-bin) having a diameter of 0.53 m internally and 0.69 externally was noticed. The width of its wall measured 0.05 to 0.08 m with a height of 0.08 m. To the north-west of the circular furnace a pointed base portion of a large storage jar was also noticed embedded in the floor. Numerous post-holes were noticed on the plan of floor level as well as on the walls suggesting that

the superstructure built of wattle and daub was supported on wooden posts fixed on the low mud wall of the house. The area outside of house was well rammed.

2. Structures in Tr. XK8

(i) Mud-house complex STR 26 in upper level of Tr. XK8, Qd.1and 2

A large mud-house complex numbered as STR 26 was encountered in the upper levels layer (1) and (2) of Tr. XK8. Qd.1 and 2. The house consisting of four rooms as revealed by its walls could have had many more rooms. This house was also oriented in north-east to south-west direction. Nine walls of this house complex numbered as 26A, 26, 26C, 26D and so on were exposed on plan. Most of them were cut by circular pits. Two almost complete rooms were noticed. One of them room “A” formed by walls 216B, 26C, 26E and 26J measured 2.70 m x 0.85 m internally and 3.40 m x 1.60 m externally. Of its four walls, south-west to south-east direction were measured 0.74 m in length and 0.35 m in width and 0.26 m in length and 0.35 m in width respectively. The extant height was 0.15 m. The other two walls running in north-west and south-east direction were measured 2.44 m and 1.29 m in length and 0.23 m and 0.50 m in width respectively. The south-western portion of the wall 26J was cut by two circular pits. The smaller width of this room suggested that it might have served as a verandah. The second room ‘B’ lying in the north eastern side of the room ‘A’ was formed by walls 26C, 26D, 26F and possibly by north-eastern extension of wall 26G. The 26C damaged by a circular pit at its north-eastern end served as partition wall in between room A and B. The room ‘B’ was measured 2.15 m x 1.60 m internally and 2.80 m x 2.15 m externally. Its south-western and north-eastern side walls 26D and 26F oriented in north-west to south-east were measured 0.36 and 1.30 m in length and 0.26 m and .037 m in width with an extant height of 0.10 m respectively. The floor of the room was well rammed. Besides burnt earth patches two stones placed side by side were noticed at the eastern corner of the room. The third room ‘C’, lying in south-western side of rooms A and B was formed by wall 26A, 26B, 26C, 26D, 26G and possibly one or more side wall in south-western side of the room, oriented in north-west to south-east direction possibly forming the south-eastern and north-eastern sides walls of the room were measured 1.24 m and 3.35 m in length and 0.49 m and 0.30 m in width with the height of 0.10 m and 0.08 m respectively. The north-eastern walls of this room were 26B, 26C and 26D. These walls served as partition walls of rooms A, B and C. This room might have a projected verandah on the south-eastern side as suggested by the projections of the walls 26A, 26B and 26C.

The well rammed floor was made of greyish compact clay. Circular burnt earth furnaces were also noticed. One of them which measured in diameter 0.24 m internally and 0.33 m externally was placed in the projected side of varandah. To the west of this furnace another circular furnace measuring 0.36 m internally and 0.45 m externally in diameter containing ash was exposed. The fourth room 'D' was possibly formed by walls 26G and 26H and other two unexcavated north-eastern and north-western walls. However only wall 26G and 26H were available forming south-western corner of the room. Walls 26H, oriented in south-west to north-east direction, measuring 1.47 m in length and 0.35 m in width, joined the south-western end of wall 26G, at right angle. The floor of this room was badly damaged by a large circular pit but the remaining portion indicated it to be well rammed.

3. Structure in Tr. XK9

(i) Mud-house in Tr. XK9, Qd.1 (STR.37)

Two walls of a house were exposed in Tr. XK9, Qd.1. Of these, the longer one (37A), oriented in north-west to south-east was measuring 3.48 m in length and 0.45 m in width. Wall 37B which joined the former at right angle, oriented south-west to north-east was measuring 1.48 m in length and 0.47 m in width. These walls forming the southern corner of a room were exposed upto a height of 0.05 m. A remarkable feature noticed here was that in the construction possibly for strengthened the walls burnt earth clods were mixed with the mud. No post-holes were noticed on the walls but outside the room numerous post-holes were noticed. The floor of room was well rammed showing ash and burnt earth patches at places. A few brick-bats were also noticed on the plan. Towards the northern side of the floor a large oval shaped burnt earth furnace was also seen suggesting that the house was occupied by a craftsman. The furnace measured 1.70 m in length and 1.10 m in width at the wider end with an extant height of 0.15 m. Its wall was 0.10 m thick.

Burnt Brick Structures

(i) Steps built of wedge-shaped burnt bricks in Tr. XG9, Qd.2 and XF9,_Qd. 1

A stair built of wedge-shaped burnt bricks with riser of 0.08 m and a treader of 0.26 m was exposed in the upper level of Tr. XG9, Qd.2 and XF9, Qd.1 which is shown in the map of Period IB as it is located to extreme right of the trench XG9. The stair of three flights of steps had a width of 1.20 m. The burnt bricks used in construction were wedge-shaped measuring in size 0.25 m in length, 0.19 m in width at wider end and 0.14 m at narrow end, and thickness 0.6 m to 0.65 m. The bricks laid horizontally were

fixed in such a manner that the wider end of one brick was connecting the narrow end of the other, alternatively, for extra adhesive power. Mud mortar was used as binding material. The uppermost and the lowermost steps consisted of 7 bricks while the middle one consisted of 6 bricks. It seems that these steps were meant for a house in upper level. In all probability these bricks which appear to be of a well have been reused.

(ii) Burnt bricks wall in Tr. XK10, Qd.3 and 4

A wedge-shaped burnt brick wall was exposed in Trench XK10, Qd.3 and Qd. 4. Oriented in north-east to south-west direction it was measuring 2.05 m in length and 0.30 m in width with height of 0.28 m. It is interesting to note that for the construction of this wall, one course of wedge-shaped burnt bricks-on-edge was used. The nine bricks of the upper horizontally laid course were placed in opposite direction alternatively i.e. the narrow end of one brick and the wider end of the other brick. The row of bricks-on-edge under the horizontally laid course of bricks consisted of six bricks also placed in opposite direction. The size of bricks measured 0.30 m in length, 0.22 m width at wider end and 0.15 m width at narrow end with thickness of 0.08 m. Mud mortar was used as binding material. The purpose of this wall could not be ascertained. These bricks were used in later structures of the upper phase.

Mud Platform

A solid mud structure possibly a platform was found running in an area of 46 m x 35 m on the south-east and south-west side of the mound. It appears to have been raised in the stages and served as a protective measure against the floods **(Pl. V)**.

PGW (Pd II)

During this period no structure was encountered except successive floor levels of huts suggesting about their living patterns. No burnt brick was noticed.

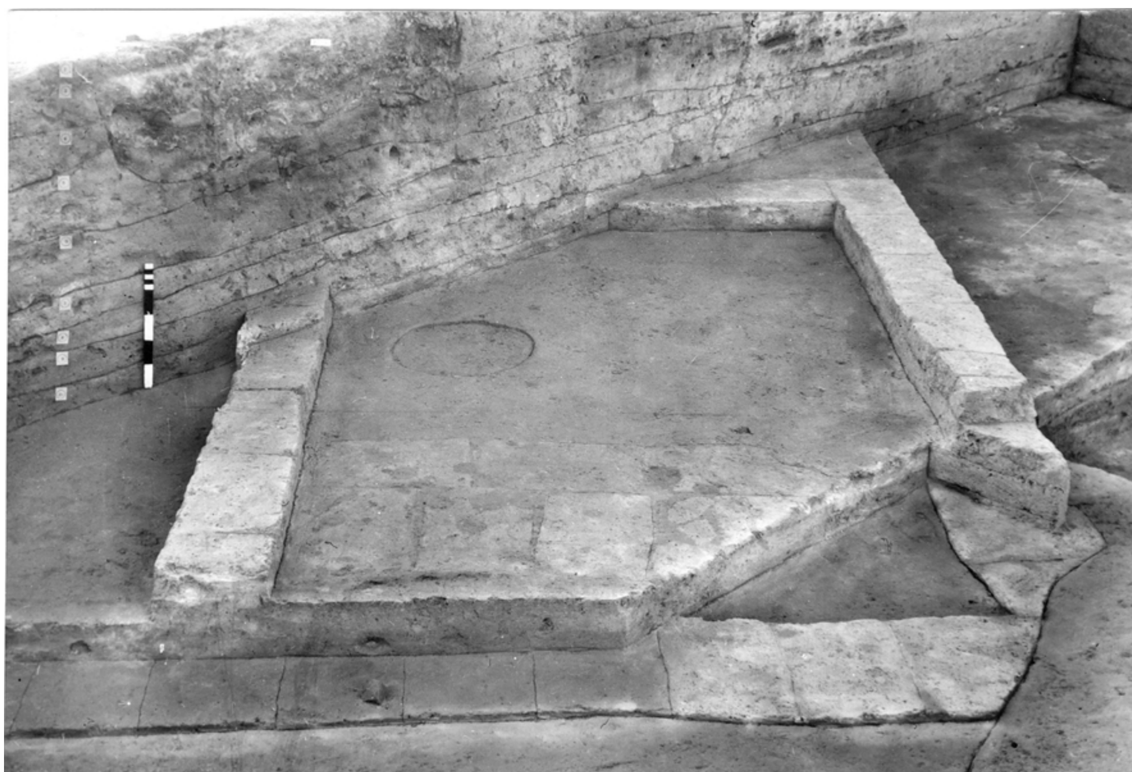
NBPW (Pd III)

In this period, no structure was encountered except evidences of wedge-shaped burnt bricks below a crushed high profile storage jar. Burnt bricks were used but no such structure was encountered.

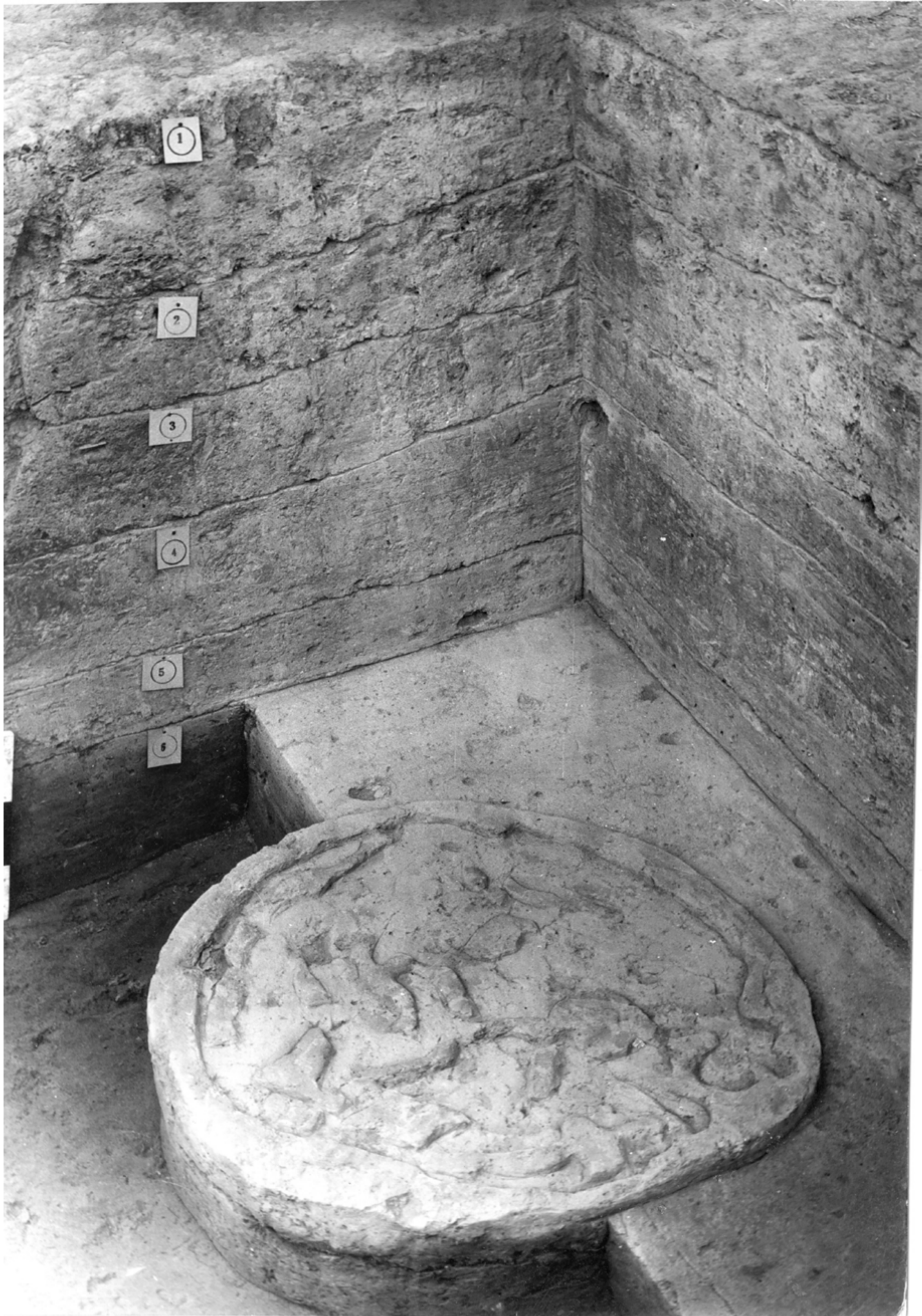
Plates



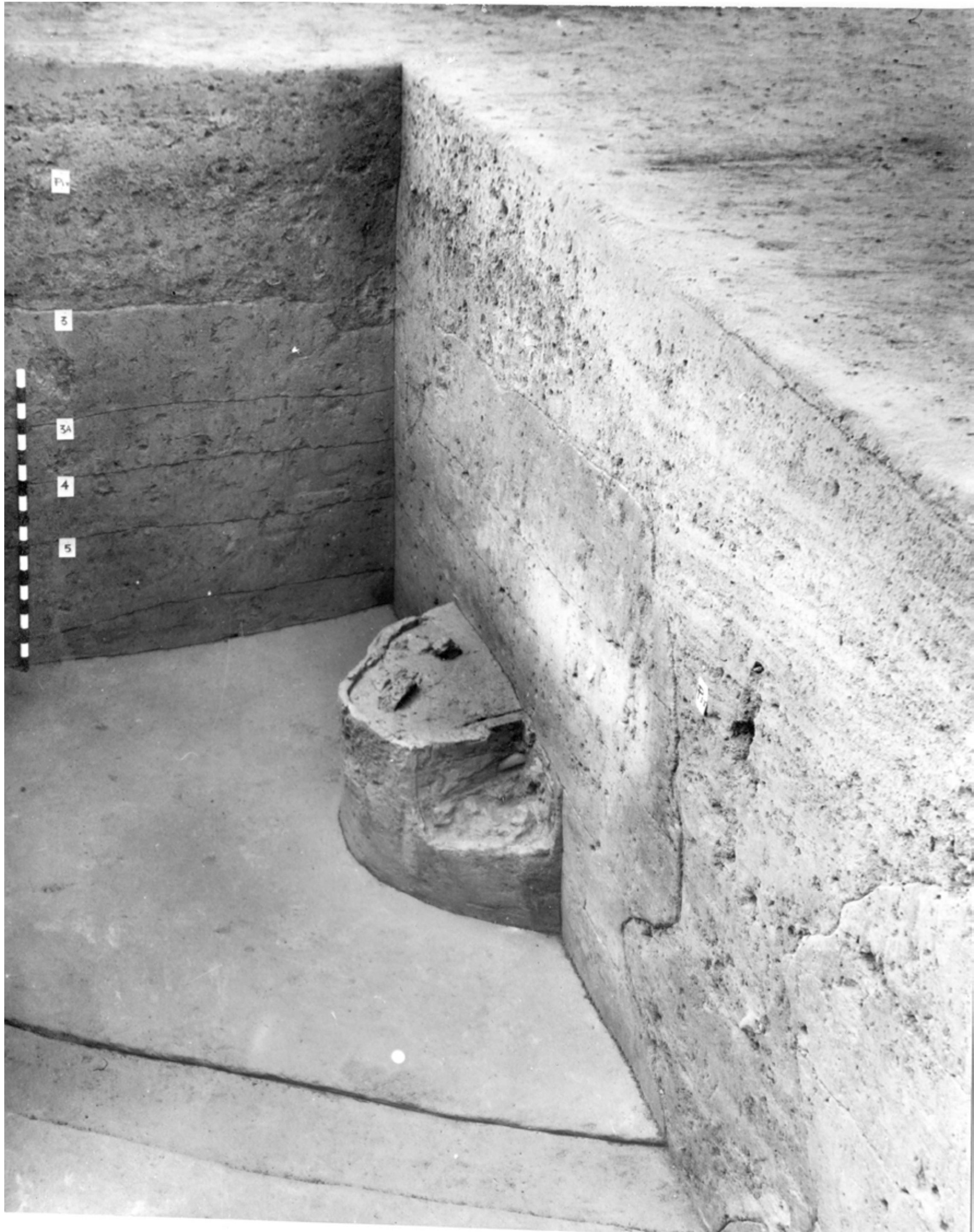
Pl. I. Mud-brick structure with post-holes, initial stage, Harappan levels (Pd IA)



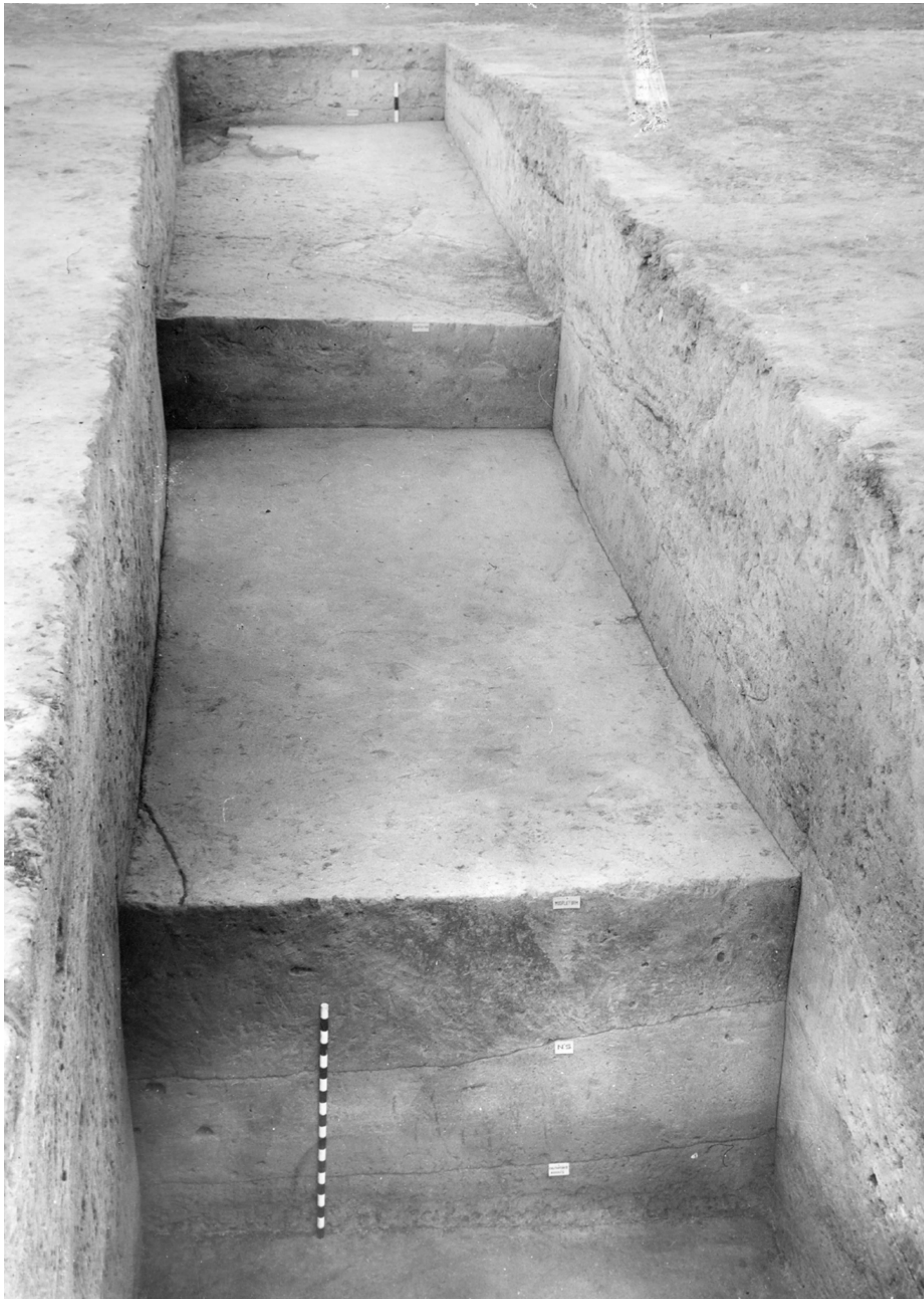
Pl. II. Final mud-brick rectangular structure, Harappan levels (Pd IA)



Pl. III. Hearth, Harappan levels (Pd IA)



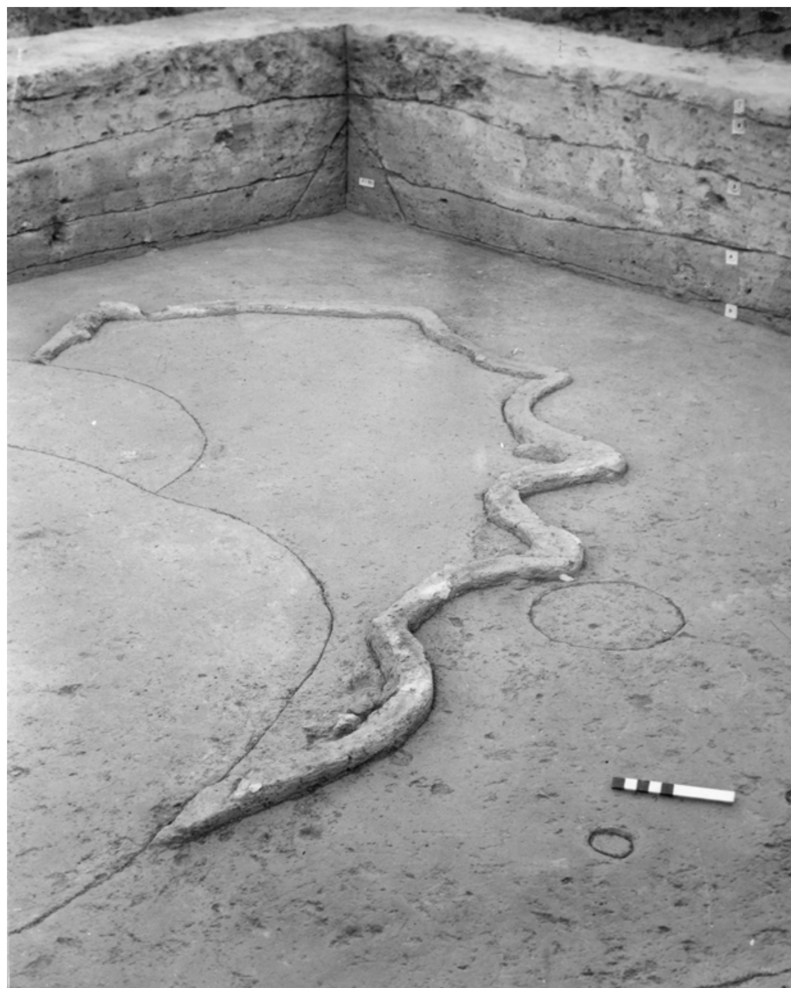
Pl. IV. Oval shaped hearth, Harappan levels (Pd IA)



Pl. V. Solid mud platform, Harappan levels (Pd IA)



Pl. VI. Hearth and mud floor, Harappan levels (Pd IA)



Pl. VII. Mud floor, post-holes and pits, Harappan levels (Pd IB)



Pl. VIII. STRS 14 A-B, mud floor and furnace, Harappan levels (Pd IB)



Pl. IX. Mud-wall (STR – 15), mud floor and furnace, Harappan levels (Pd IB)



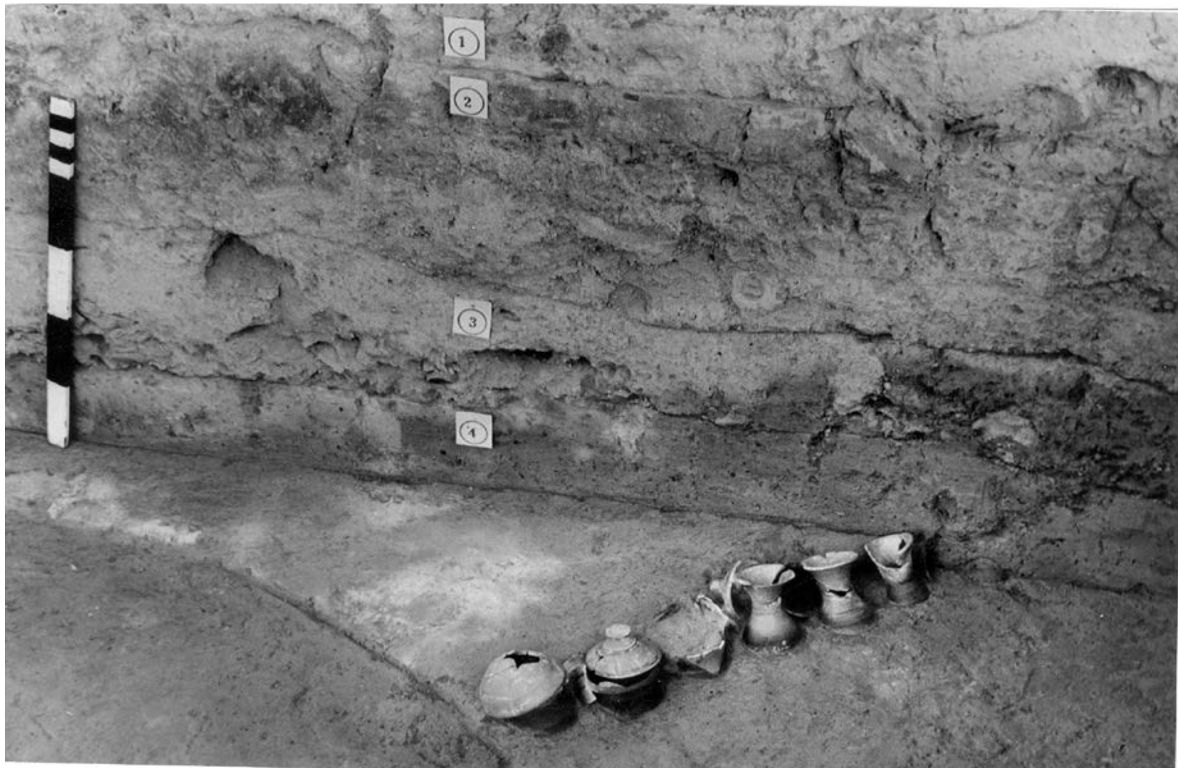
Pl. X. Plan of circular huts and mud house, Harappan levels (Pd IB)



Pl. XI. Mud floor, mud walls and post-holes, Harappan levels (Pd IB)



Pl. XII. Hearth, Harappan levels (Pd IB)



Pl. XIII. A row of miniature pots on the site of a circular pit, Harappan levels (Pd IB)



Pl. XIV. Plan of a rectangular mud house, mud floor, hearth and post holes, Harappan levels (Pd IB)



Pl. XV. Mud floor, Harappan levels (IB)



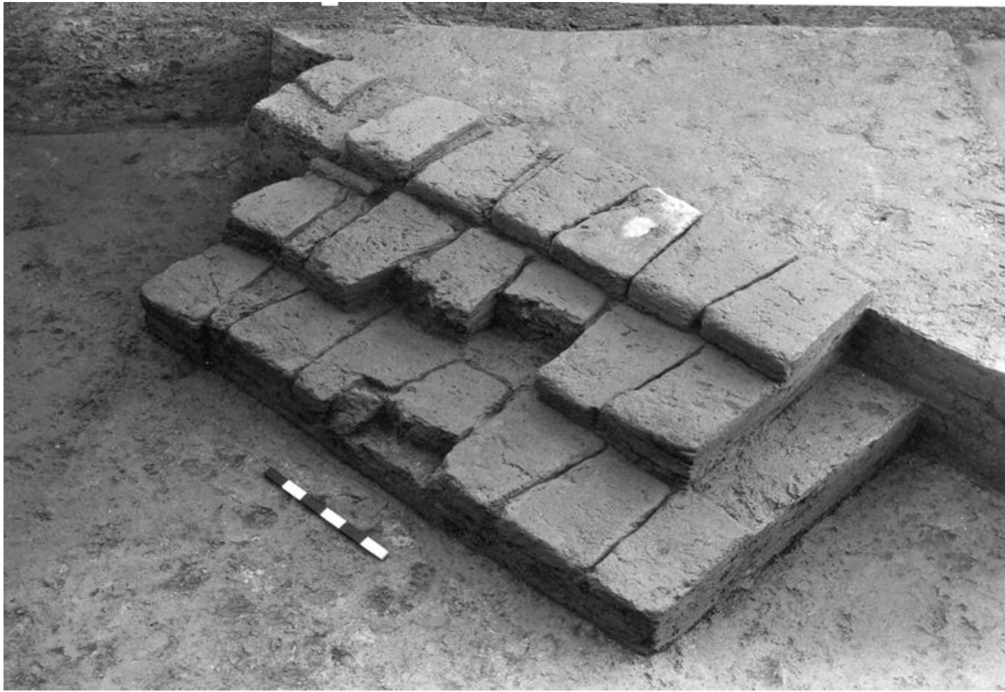
Pl. XVI. Mud floor and a pit containing pots, Harappan levels (IB)



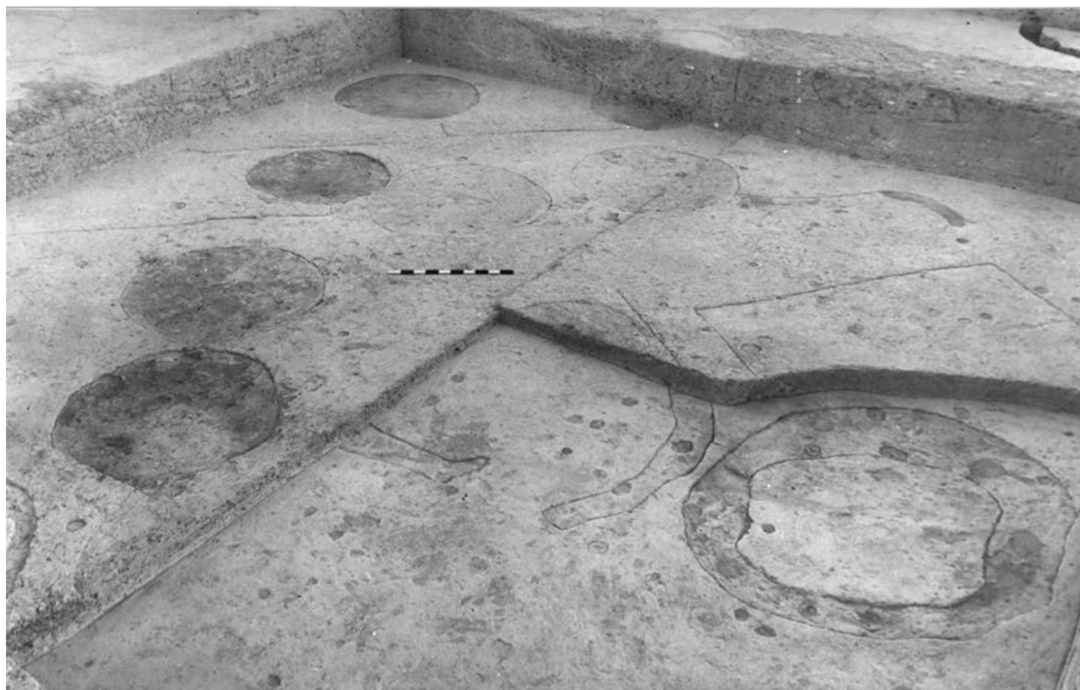
Pl. XVII. Mud floor, hearths and pit activity, Harappan levels (Pd IC)



Pl. XVIII. Mud house complex, mud floor, hearth and pit activity, Harappan levels (Pd IC)



Pl. XIX. Staircase made of wedge-shaped burnt bricks, Harappan levels (Pd IC)



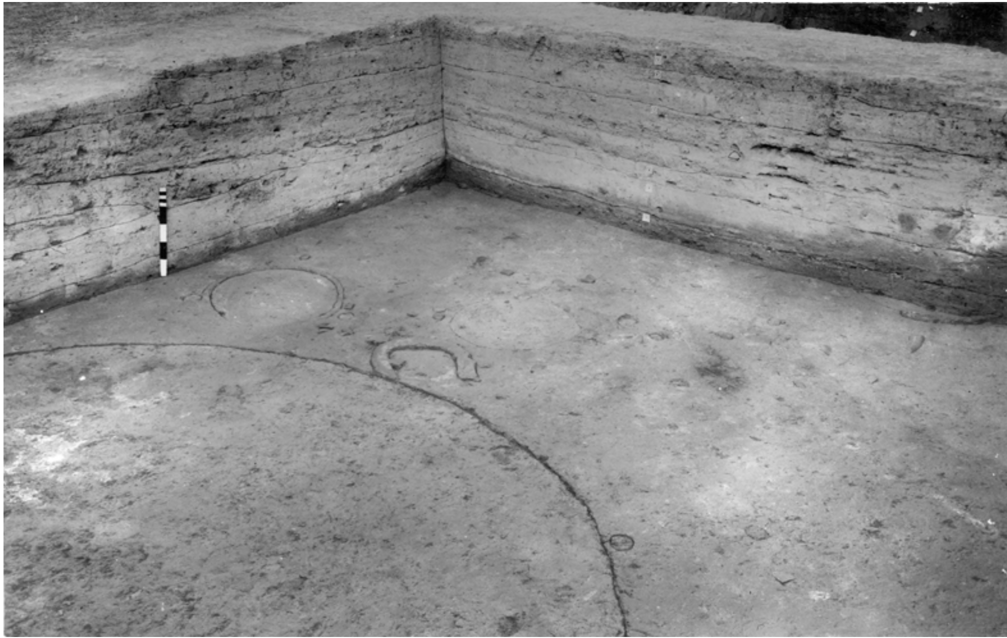
Pl. XX. Circular huts (STRS 16, 17), mud house (STR 35), mud floor and pit activity, Harappan levels (Pd IC)



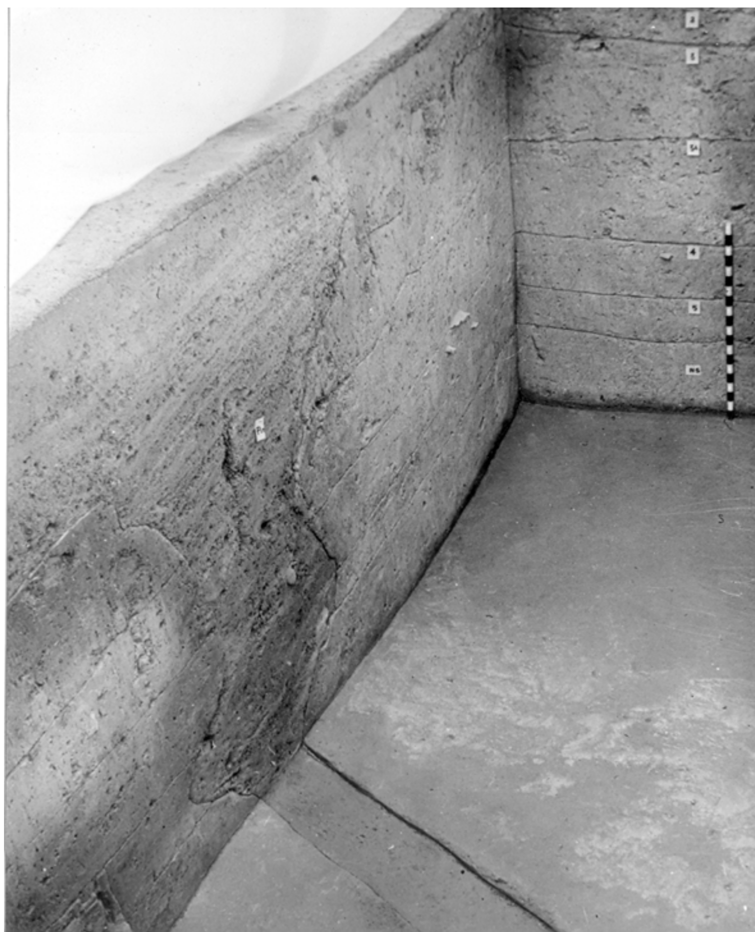
Pl. XXI. Hearth, Harappan levels (Pd IC)



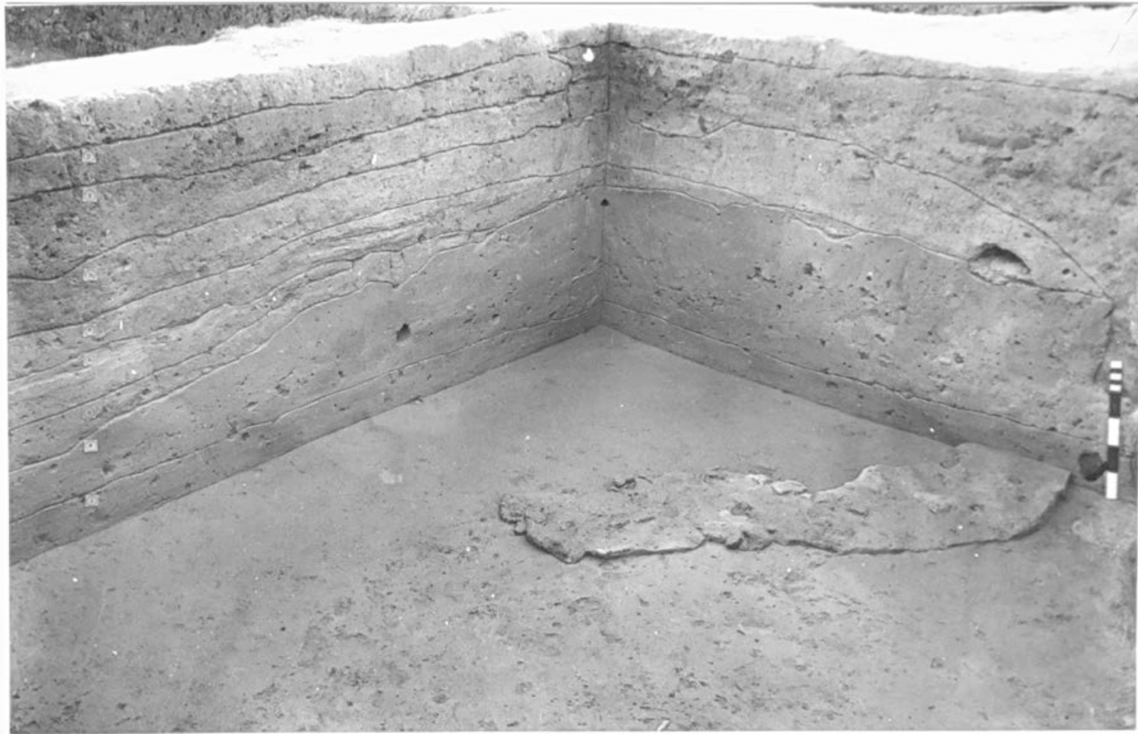
Pl. XXII. Earthen basin, Harappan levels (IC)



Pl. XXIII. *Chullah*, buried basin and pit, Harappan levels (IC)



Pl. XXIV. Mud floor, Harappan levels (IC)



Pl. XXV. Mud wall, Harappan levels (IC)



Pl. XXVI. Pots found in pit, Harappan levels (IC)

Kushan Period (Pd IV)

Massive Burnt Brick Structure (Fig. 7; Pls. XXVII-XXX)

A massive burnt brick structure consists of two massive and two minor arms were exposed in Trenches A2, A3 x B2 x B3, XC2 x C3 x D, XD1, XD2, XE1 and XE2. The extant portion of this structure covered an area of about 60 x 25 m. The burnt bricks used for the construction of the structure, measuring in sizes 52 x 26 x 8 cm, 51.1 x 21.65 x 8 cm, 50 x 26 x 8 cm, 51 x 27 x 8 cm, 49 x 26.5 x 8 cm, 51 x 26 x 8 cm etc. were bounded with mud mortar in English bond pattern. Of its two massive arms, the shorter one was running in north to south direction. Its extant length measured 15.13 m with a width of 2.12 m. the available maximum height was measured 0.80 m with extant ten courses of bricks including one course of mud-bricks at the base. The size of burnt brick used was ranging 47 to 52 cm in length, 25 to 27 cm in width and 7 to 8 cm in thickness. Numerous circular pits cutting the bricks suggested a large scale robbing of bricks. At the southern end of this wall it was joined by a comparatively longer wall roughly at right angle. But the junction of these two walls was roundish externally whereas internally it had a rectangular projection of 1.78 m x 1.46 m. The longer arm oriented in west to east direction was measured 57.6 m in length (including a thin curved line of fallen bricks at eastern end) and 2.12 m in width. The maximum extant height of this wall was 1.80 m. It comprised eighteen courses of burnt bricks and one course of mud brick at the bottom. However, the larger length of this arm consisted of 6 to 9 courses of burnt bricks with height of 0.60 to 0.80 m. Towards the eastern side of this wall at a distance of about 43.60 m from the central point of the roundish corner a 2.40 m wide gape was also noticed. Whether this gap served some purpose or resulted due to robbing of bricks cannot be said. At this very spot inner projections of bricks having five courses on either side were seen. These projections seem to be a later addition because the lowest course of the projections rested on the uppermost seventh course of the wall.

The drains running across (north-south the longer wall, possibly) discharging sullage into the rain *gulley* were also noticed. The depth and width of one of the drains, at a distance of 4.23 m from the roundish corner were 1.10 m and 0.32 to 0.36 m respectively. It has thirteen courses of a brick-work at the movement having a pavement of two courses of bricks. The other drain 0.30 m wide at a distance of 13.45 m from the former was a covered one. It was slightly projected out.

At the extant eastern end of the east-west end, it was further joined by a minor wall oriented in south-north direction. This wall having a 0.85 m in length and 0.77 m

in width with extant six courses of burnt bricks. Again at the western end this wall was also joined by another wall at right angle measuring 3.60 m in length and 0.70 m in width with extant height of 0.76 m. Its ten courses were exposed. Its westward extension was not available possibly these two minor walls along with the massive wall formed a small room with a wicket gate from eastern side.

This massive structure was found sealed by layer (4) contemporary layers marked were (5) and (6) which constitute Kushan deposit.

Structure 2

The massive burnt brick structure was noticed striking against a 0.80 m thick platform made of mud and mud-bricks. A rectangular structure built of wedge-shaped burnt brick was exposed over the platform. This structure internally measured 4.45 m x 3.65 m. The east-west arms of this structure externally measured 5.96 m and 6.10 m in length respectively. The rear arm or north-south arm on the western side was 5.30 m in length. The width of the walls measured 0.80 m except the north-south arm on the western side. The maximum extant height of the north-south wall on rear end was 0.80 m composed of eleven wedge-shaped burnt brick courses while in the east-west wall the maximum number of courses were ten. The size of the wedge-shaped bricks used in the structure was 36 and 36.5 cm in length, 20.5 cm and 20.7 cm in width at the wider end, 13.6 cm and 13.7 cm width at the narrow end and thickness 6/6.5 cm. It seems these bricks were taken off from a circular structure possibly from a well for the construction of these structures. The east-west arm in the northern side was probably having a 1.05 m wide entrance, paved with wedge-shaped burnt bricks. But the main entrance was possibly from the eastern side. A rectangular structure also made of wedge-shaped bricks was noticed in the centre on eastern side. A semicircular niche like formation having a diameter of 0.90 m was noticed in the centre of the inner side of the rear western wall suggesting that this very structure was a religious one enshrining a deity in the niche. In front of this wedge-shaped burnt brick rectangular room an addition of a structure consisting of two walls was also seen. Of its two arms joining each other at right angle, the east-west wall in the alignment of the southern east-west wall of the former structure was measured 4.60 m in length and 0.55 m in width. Rectangular burnt bricks and brick-bats were used in the construction of this wall. The other wall joining its eastern end at right angle was oriented in north to south direction. It measured 9.25 m in length including a 3.77 m wide gap and 0.50 m in width. Its height measured 0.60 m with 7 courses of burnt bricks. The average brick size was 50 cm x 25 cm x 7 cm.

Wall of wedge-shaped burnt brick

Between the east-west wall on the southern side of the wedge-shaped burnt brick structure and the longer arm of the massive burnt brick structure a circular wall measuring in diameter 0.67 m internally and 1.44 m externally was exposed. The sizes of the wedge-shaped bricks used in this wall were:

(i) 37 cm and 37.5 cm in length, 15 and 16 cm in width at wider end and 10 cm at narrow end and thickness 7 cm.
(ii) 30.5 cm in length, 21.5 cm in width at wider end and 13 cm width at narrow end and thickness 6.5 cm.
(iii) 29 cm in length, 17 cm in width at wider end and 10 cm width at narrow end and thickness 6 cm.
(iv) 38 cm in length, 21 cm in width at wider end and 12 cm width at narrow end and thickness 6.5 cm.

This wall was sealed by layer 3.

Burnt brick wall in Tr. ZA1, Qd.2

A burnt brick wall oriented in north-east to south-west direction was encountered in Tr. ZA1, Qd.2. This wall damaged by pits on either end measured 2.45 m in length and 0.50 m in width with an extant height of 0.82 m. Nine courses of burnt bricks laid in English bond fashion were noticed. The size of the bricks used in the structure was 50x26x7 cm. Mud mortar was used as a binding material.

This wall was also found sealed by layer (2). Contemporary layers were (3) and (4).

Burnt brick wall in Trench ZA2, Qd.3

A portion of a burnt brick wall, possibly north-eastern extension of the wall exposed in Trench ZA1, Qd.2, was also exposed in Tr. ZA2, Qd.3. This wall in the alignment of the former was measured 1.46 m in length and 0.50 m to 0.51 m in width with an extant height of 0.34 m. Four extant courses of bricks in English bond system were noticed. The size of bricks was 50x260x7 cm. Mud mortar was used as a binding material. The north-eastern end of the wall was disturbed by a large pit so its further extension could not be traced.

This wall was found sealed by layer (2). The contemporary layers marked were layers (3) and (4) which constitute the Kushan deposit.

Well of wedge-shaped burnt bricks

A well made of wedge-shaped burnt bricks with an exterior diameter of about 1.44 m was noticed in the courtyard of the massive burnt brick structure ascribable to the Kushana period. The sizes of bricks vary from 37 to 39 cm in length to 15-16 cm in width at wider end and to 10 cm at the narrow end with 7 cm thickness.

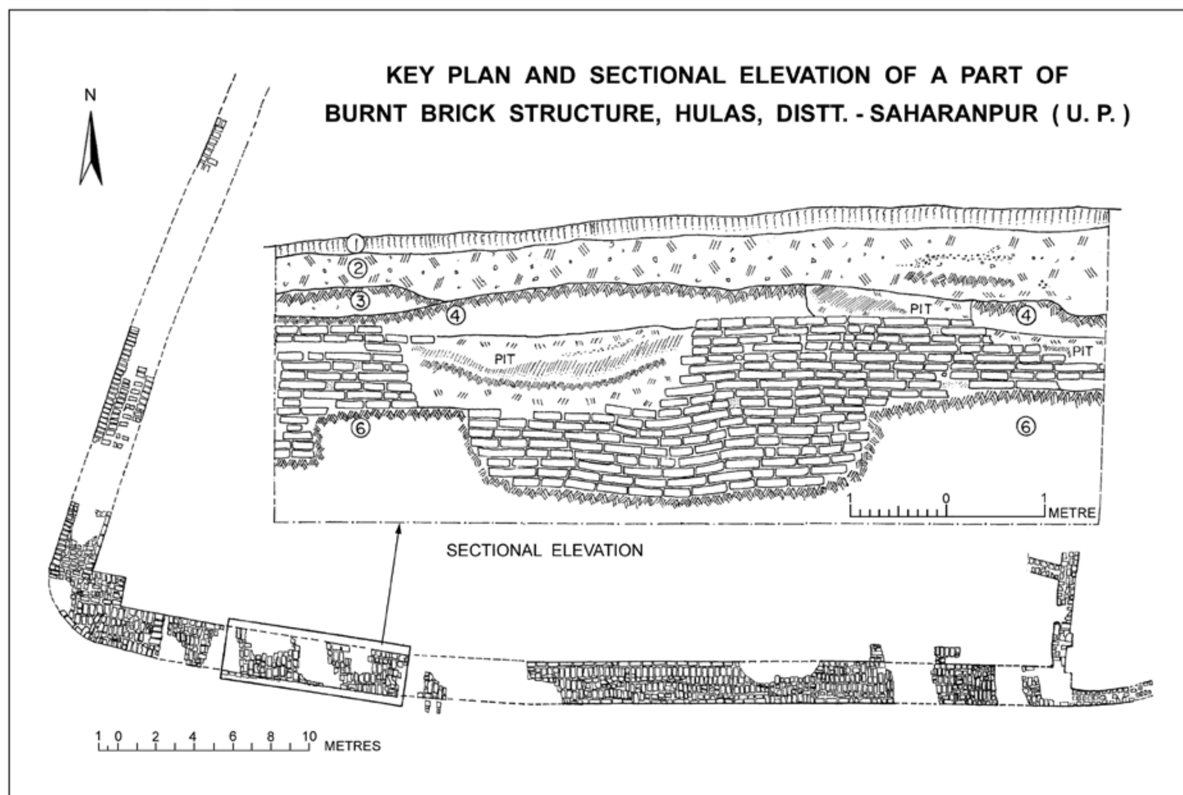


Fig.7. Sectional elevation of a part of massive burnt brick structure



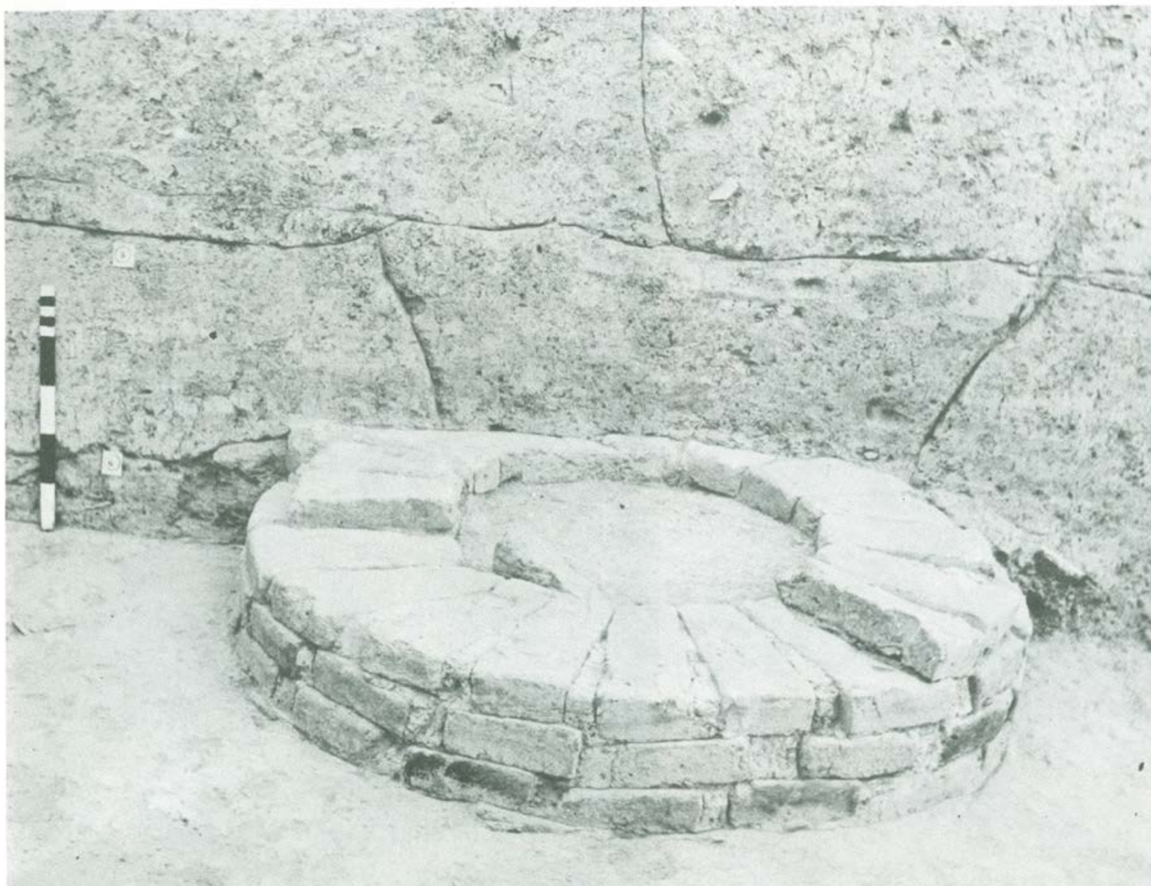
Pl. XXVII. Massive burnt brick structure, Kushan levels (Pd IV)



Pl. XXVIII. Massive burnt brick structure, Kushan levels (Pd IV)



Pl. XXIX. Massive burnt brick structure, Kushan levels (Pd IV)



Pl. XXX. Well of wedge-shaped burnt bricks, Kushan levels (Pd IV)

Medieval Period (Pd V)

Brick-wall in Tr. XA, Qd.1

A damaged wall assignable to medieval period was exposed in Tr. XA, Qd.1. Burnt brick-bats were used in construction of this wall. It was oriented in north-east to south-west direction, measuring 2.10 m in length and 0.70 m in width with an extant height of 0.40 m. It was raised of five courses of brick-bats bond with the mud mortar.

This structure was found sealed by layer (1) and from its contemporary layers (3) and (3A) copper coins of Medieval/Muslim period were recorded.

CHAPTER – IV

The Pottery

Introduction

The pottery from Hulas is characterized by six principal groups (i) Painted and incised Harappan ware including simple red ware (ii) Painted Grey Ware (PGW) and associated red ware (iii) The Associated red ware of Northern Black Polished Ware (NBPW) period (iv) Kushan Red pottery (v) Decorated pottery showing incised, applique, stamped, moulded patterns including red ware of Gupta and medieval period. Other wares in context of the cultural assemblages in different periods, except a few new shapes, bear similarity with the pottery of comparable periods found at other excavated sites in northern India. A solitary sherd of red ware having black and purple painted designs on cream-slipped surface, noticed in Period (I) is noteworthy for its affinity with the Nal ware.

The pottery of group (i) occurs in profuse number along with its painted designs and shapes throughout the occupational deposit. Details of the typical painted designs and shapes are illustrated separately with a view to follow the painting styles.

In the next group, the Painted Grey Ware, a total change in the ceramic industry is noticed. This well-known deluxe ware is distinctly separate from Period I and faced a natural decay till it overlapped with the ceramic of Period III. The painted designs of the PGW are discussed separately.

The sherds of Northern Black Polished Ware of group (iii) were rare throughout the entire occupational phase of Period III, although its associated wares were quite profuse in quantity.

The Kushan red ware was found in a good number from the assemblage of Period IV. The red ware of group (v) and (vi) marked as Period V is generally painted and the moulded ware is also included in this group.

Period I

Painted and incised Harappan ware.

Period II

(i) Painted Grey Ware

(ii) Other associated Ware

Period III

(i) Northern Black Polished Ware (ii) Other associated Ware

Period IV

(i) Kushan Red Ware

Period-V
Gupta and Early Medieval

(i) Red ware (ii) Moulded and stamped ware

PERIOD I

Harappan Pottery

The pottery at Hulas is largely wheel-made, although some handmade sherds were also found. The regular striation marks suggest the possible use of fast wheel. It has a mixture of tempering materials such as sand, lime or rice husk. The clay used by the potters is of fairly good quality, as is revealed by the cohesion of clay particles. Fine sand which cannot be detected with naked eye is also used. A special paste was sometimes used for the smaller pots and burned to a dark red colour in the kiln.

The technique of manufacturing is not very clear but the ware at Hulas, on the whole is well baked, and can withstand the attack of damp and salt. How it was baked is not known. Generally the pottery is thick, well levigated, well fired and gives a metallic sound. About fifty per cent pottery is dressed by way of applying slip. The red ware constitutes the majority. In this case, the pottery bears slip which was obtained by application of red oxide. The red ware was fired under fully oxidising condition.

A few of the pots were made in two pieces which were joined together when wet, while in some cases the neck of the jars was also made separately and luted subsequently. This method of manufacturing jars is hard to detect, as the joining junctures were frequently obliterated by a final trimming.

The pottery is largely pinkish in appearance with a red slip and paintings done on black or shades of it. The grey ware is coarse, devoid of paintings and the percentage of this ware is fairly low. The thread marks at the bottom of certain pots provides a clue that the wheel was rotated from both the sides i.e. clock-wise and anti clock-wise. It is

generally the upper part of the pots which are covered with slip, whereas the lower portion is left roughened and sometimes found decorated with a cord. Often the interior surface is much better finished than the exterior and in a few cases both surfaces are equally finished. Cream slip is rarely used and might have been a post-firing phenomenon. The cream colour may be due to the application of gypsum.

Though the unpainted pottery is more than the painted ones, the wealth of decoration makes up the feeling that all are painted. Painted pottery is more frequent in lower levels. The painted motifs generally include conventional plants, vertical and horizontal strokes between triangular motifs. Most of the incised or impressed designs have appeared in the paintings or vice-versa. Incised pottery was also found and includes wavy and horizontal lines, but the incised decoration is limited to the exterior surface.

The painted designs and patterns include intersecting loops and circles, suspended loops, triangles, latticed diamonds, wavy bands, criss-cross designs, chevrons, fish-net motif, floral, bird motifs, etc. Geometrical designs are very popular, but this motif occurs singularly and along with other motifs. Horizontal lines are sometimes very thin and deliberately drawn, but occasionally they are bold and not drawn carefully. Lines of latter category are on storage jars, which were not meant for finer use. The lines are sometimes curved, zig-zag and wavy. Figures of plants are depicted with realistic look. Oblique chains are rarely used. Straight line is the simplest motif on pottery at Hulas but appears alone in few cases and mostly combined with or supplementing some other motif. Like other painted motifs, circles appear mostly along with other designs. Intersecting circles are some of the common motifs, sometimes they are painted on plain surface and sometimes having dots etc. Among birds peacock is the only motif. A panel of peacocks one after the other, with a nest very much exaggerated and body stripped with oblique strokes is also available. Fish, the only aquatic motif, dressed with oblique lines and a dot in one of the three curved lines, suggesting their eyes.

Generally, the big storage jars are almost plain, save for a few horizontal bands confined to rim, neck, shoulder and belly. The lowermost portion is left bare. But the medium sized jars are richly decorated and are much alive with paintings as the large jars are without it. The general tendency is to take up horizontal registers than vertical ones.

The majority of the pots which are utilitarian in character have flat bases. Most of the dishes are plain on the underside, but some have a ring-base. The height and

diameter of ring-bases vary according to the size of dish. Most of the miniature pots have pedestal bases, while some have flat and disc bases. Cups found at Hulas have the tendency of tapering towards pedestal.

Painted Designs (Figs. 1-3; Pls. I-X)

Fig. 1

1. Fragment of a vase having bright red slip, body below the neck is painted in black pigment with a panel of peacocks one after the other within horizontal bands. The body of the peacock is painted with oblique parallel lines. From Period I.

2. Fragment of a jar with brownish slip on the shoulder painted in black pigment with peacock leg and feathers above horizontal bands. The feathers are painted with oblique wavy lines. From Period I.

3. Fragment of the upper part of a vase having red slip, painted in black pigment with fish-net motif in a horizontal register between horizontal bands. From Period I.

4. Sherd painted in black pigment over red slip with horizontal strokes on vertical line and a floral design. From Period I.

5. Shoulder part of a jar having red slip, painted in black pigment with triangles formed by running loops below the horizontal bands. The body of the triangles filled up with horizontal bands and the topmost of with vertical strokes. From Period I.

6. Shoulder part of a red slipped vase painted in black pigment with horizontal row of latticed diamonds within the horizontal bands. From Period I.

7. Upper part of a red slipped storage jar painted in black pigment with vertical strokes on parallel loops and a latticed upright triangle within horizontal bands. From Period I.

8. Shoulder part of a brownish slipped vase painted in black pigment with group of parallel horizontal bands extending to the neck portion. From Period I.

9. Fragment of the upper part of a red slipped jar, painted in black pigment with latticed triangles formed by running loop and two thick wavy bands, each bordered above and below by double horizontal bands. From Period I.

10. Sherd painted in black pigment over red slip with latticed diamond motif having small sized double circles placed as on both sides. From Period I.

11. Red slipped vase with beaked rim raised neck and bulbous body, painted in black pigment with horizontal bands on rim, shoulder and body. From Period I.

12. Red slipped vase with broken rim, spherical body, disc base, painted in black pigment with horizontal bands on the shoulder having vertical strokes after regular gaps. From Period I.

13. Upper part of a vase having red slip, painted in black pigment with dots in the cavity formed by the intersecting loops bordered with the horizontal bands. From Period I.

14. Shoulder part of a red slipped vase, painted in black pigment with dots in the cavities formed by the intersecting loops below the horizontal bands. From Period I.

15. Sherd having red slip, painted in black pigment with intersecting loops with the horizontal bands. From Period I.

16. Fragment of a red slipped vase, painted in black pigment with a latticed diamond above the horizontal bands. From Period I.

17. Fragment of a red slipped vase, painted in black pigment with a latticed triangle formed by a running loop below the horizontal bands. From Period I.

18. Shoulder part of a red slipped jar, painted in black pigment with horizontal bands. From Period I.

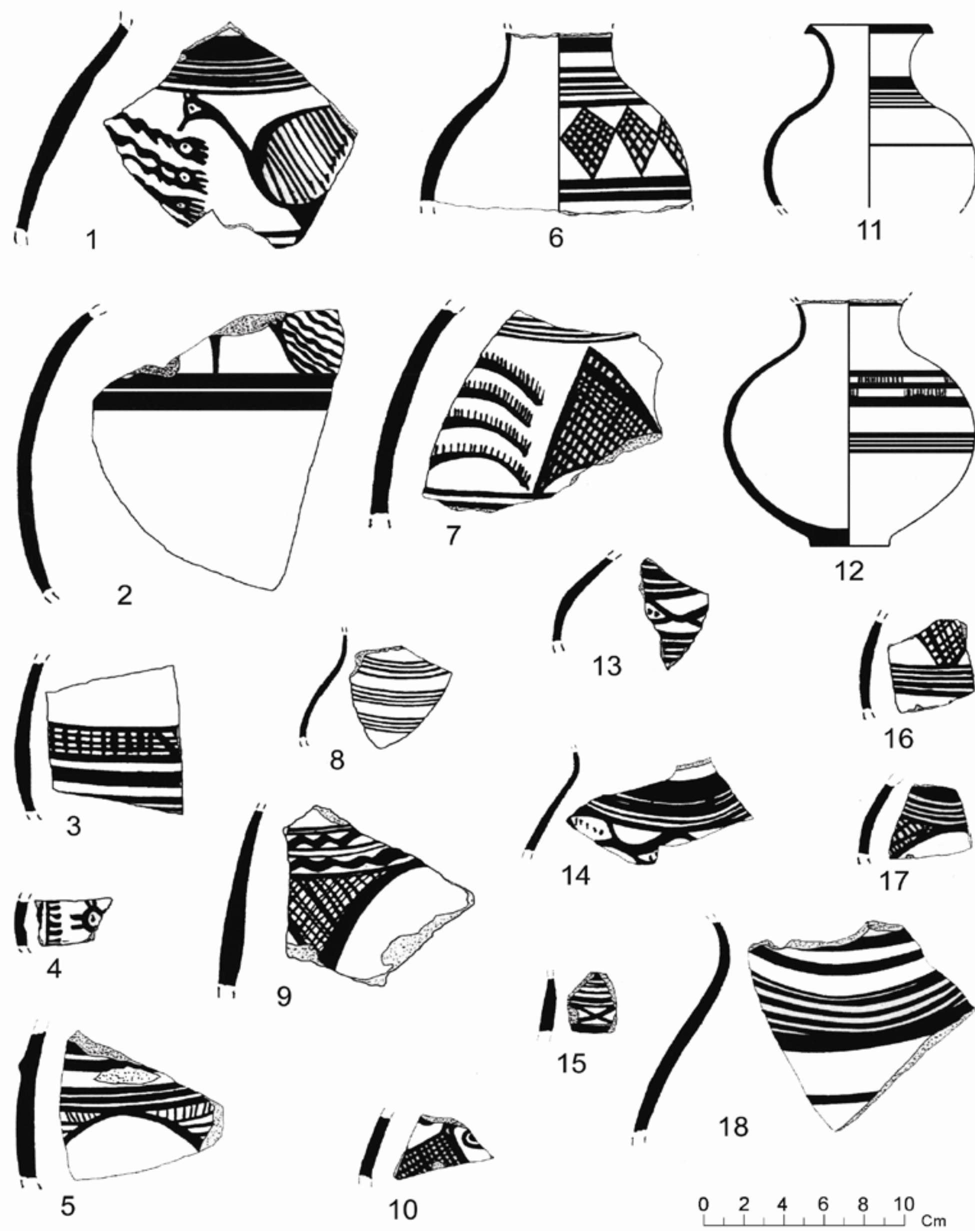


Fig.1. Harappan pottery: painted designs

Fig. 2

19. Basin of medium size in thick fabric with a flat rim and slightly convex sides. Treated with red slip and painted in black pigment with thick horizontal strokes between oblique bands below a thick horizontal band on the neck. From Period I.

20. Fragment of a jar having red slip and painted in black pigment with leaf-motif and vertical strokes bordered with horizontal bands. From Period I.

21. Large thick convex-sided bowl with a featureless rim. Treated with red slip and painted in black pigment with horizontal bands. From Period I.

22. Sherd having red slip, painted in black pigment with thick oblique strokes within horizontal bands. From Period I.

23. Fragment of a jar having red slip, painted in black pigment with body below the mouth of a peacock. The body of the peacock bears the dots. From Period I.

24. Shoulder part of a vase, painted in black pigment over red slip with triangle formed by a running loop below horizontal bands. The triangles are decorated with horizontal parallel lines and the blank space in between two triangles making an arch is painted up with circles and dots. From Period I.

25. Fragment of a jar having red slip, painted in black pigment with vertical lines and a thick oblique stroke below a thick horizontal band. From Period I.

26. Fragment of a jar having red slip and painted in black pigment with thick vertical strokes below horizontal bands. From Period I.

27. Upper part of vase, painted in black pigment over red slip with rows of oblique strokes meeting to form a chevron within thick horizontal bands. From Period I.

28. Fragment of a jar, painted in black pigment over red slip with oblique strokes on a thick vertical line, representing a plant motif. From Period I.

29. Shoulder part of a vase, having red slip, painted in black pigment with a thick wavy band within the horizontal bands. From Period I.

30. Upper part of a vase painted in black pigment over red slip with an inverted rack design within horizontal bands. From Period I.

31. Fragment of a vase, painted in black pigment over red slip with thick zig-zag lines between horizontal bands. From Period I.

32. Fragment of a vase, having brownish slip, painted in black pigment with plant motif below horizontal bands. From Period I.

33. Fragment of a red slipped vase, painted in black pigment with a fish. The body of the fish bears vertical strokes. From Period I.

34. Fragment of a vase, having red slip, painted in black pigment with the neck and mouth of a peacock below a horizontal band. From Period I.

35. Belly part of a vase, painted in black pigment with a row of triangles formed by a running loop below the horizontal bands. The triangles are filled with oblique bands and double semicircles. From Period I.

36. Fragment of a jar, having red slip and painted in black pigment with group of oblique strokes issuing from two thick oblique lines below horizontal bands. From Period I.

37. Base of a dish-on-stand with a beaked rim, medium fabric and red slip, painted in black pigment with oblique strokes on one of the vertical lines in a group and a vertex of the latticed triangle crossing the concentric circles upto the rim. A band is also visible on the back of the rim. From Period I.

38. Upper-part of a vase, painted in black pigment over red slip with hatched vertical strokes within horizontal bands and a row of intersecting triangles below horizontal bands. From Period I.

39. Fragment of a jar, having red slip, painted in black pigment with two triangles within the horizontal bands. The body of the triangles also having horizontal bands. From Period I.

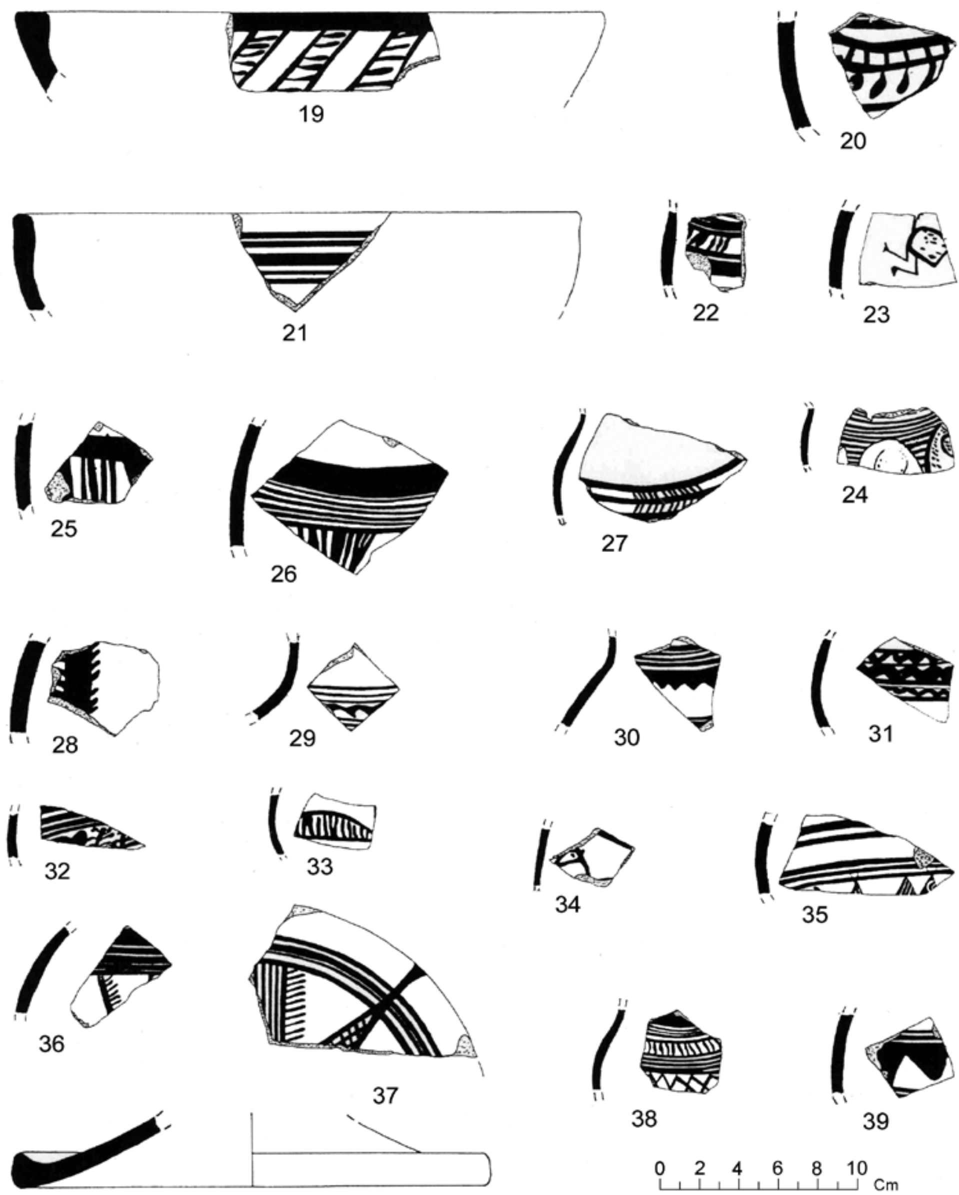


Fig.2. Harappan pottery: painted designs

Fig. 3

40. Upper-part of a thick, large storage jar, painted in dark brown pigment over dull-red slip with triangles below horizontal bands. From Period I.

41. Belly-part of a vase, painted alternately in black and creamish pigment over red slip with horizontal bands. From Period I.

42. Shoulder part of a red slipped vase, painted in black pigment with a thick horizontal band within horizontal bands. From Period I.

43. Upper part of a vase, having red slip and painted in black pigment with horizontal bands. From Period I.

44. Fragment of a vase, painted in black pigment over red slip with criss-cross pattern within horizontal bands. From Period I.

45. Fragment of a vase, having red slip and painted in black pigment with fish-net motif between two horizontal bands and a thick horizontal band below it. From Period I.

46. Fragment of a thick, large storage jar, painted in black pigment over red slip with circles containing three vertical wavy lines each, panelled by latticed designs below and above a fish-net band. From Period I. This motif has also been noticed in Early Harappan levels at Kalibangan.

47. Upper part of a red slipped vase, painted in black pigment with horizontal bands. From Period I.

48. Upper part of a thick storage jar, painted in black pigment over red slip with horizontal bands and two thick wavy lines. From Period I.

49. Fragment of a jar, having red slip and painted in black pigment with a wavy line within two horizontal bands. From Period I.

50. Fragment of a thick jar, painted in black pigment over red slip with *pipal* leaf motif. From Period I.

51. Fragment of a thick jar, having red slip and painted in black pigment with a wavy line between horizontal bands. From Period I.

52. Fragment of a vase of medium fabric, having red slip and painted in black pigment with oblique lines with thin oblique strokes and a *pipal* leaf within horizontal bands. From Period I.

53. Shoulder part of a vase, painted in dark brown pigment over dull red slip with intersecting loops forming eyelets filled with dots within horizontal bands. From Period I.

54. Fragment of a red slipped jar, painted in black pigment with three oblique rows of roundels forming chains and filled with intersected oblique lines below a thick horizontal band. From Period I.

55. Fragment of a jar, painted in black pigment over red slip with loops forming vertical chains below horizontal bands. From Period I.

56. Fragment of a jar, painted in black pigment over red slip with thick oblique lines having oblique strokes. From Period I.

57. Fragment of a jar, painted in dark brown pigment over dull red slip with two horizontal bands and a fish above it. The body of the fish having oblique lines and a dot in one of the three curved lines, suggesting eye of the fish. From Period I.

58. Fragment of a jar, painted in deep black pigment over deep red slip with long neck and mouth of a peacock. From Period I.

59. Upper part of a red slipped jar, painted in black pigment with single or multiple horizontal bands and a group of vertical lines with a suspended loop from a horizontal bands. From Period I.

60. Fragment of a jar, painted in black pigment over red slip with oblique lines on either side of a group of four vertical lines above a thick horizontal band. A thick oblique strike is also visible below. From Period I.

61. Fragment of a red slipped vase, painted in black pigment with a thick wavy line between horizontal bands and a group of vertical strokes below it. From Period I.

62. Fragment of a vase, painted in black pigment over red slip with a tapering oblique stroke and mesh design formed by the curved lines below horizontal bands. From Period I.

63. Fragment of a vase painted in black over red slip with a latticed triangle flanked by three vertical wavy lines and vertical bands of chevrons; below are shown three horizontal lines.

64. Fragment of a vase, treated with red slip on the shoulder and painted in black pigment with latticed triangles above horizontal bands. From Period I.

65. Fragment of a jar, treated with dull red slip on the shoulder and painted in dark brown pigment with oblique lines above horizontal bands. From Period I.

66. Fragment of a red slipped vase, painted in black pigment with oblique strokes below two horizontal bands. From Period I.

67. Shoulder part of a red slipped vase, painted in black pigment with a latticed triangle within horizontal bands. From Period I.

68. Upper part of jar, having red slip and painted in black pigment with a latticed triangle and loops on other side of a group of three vertical lines. The vertex of the latticed triangle cross the horizontal lines. From Period I.

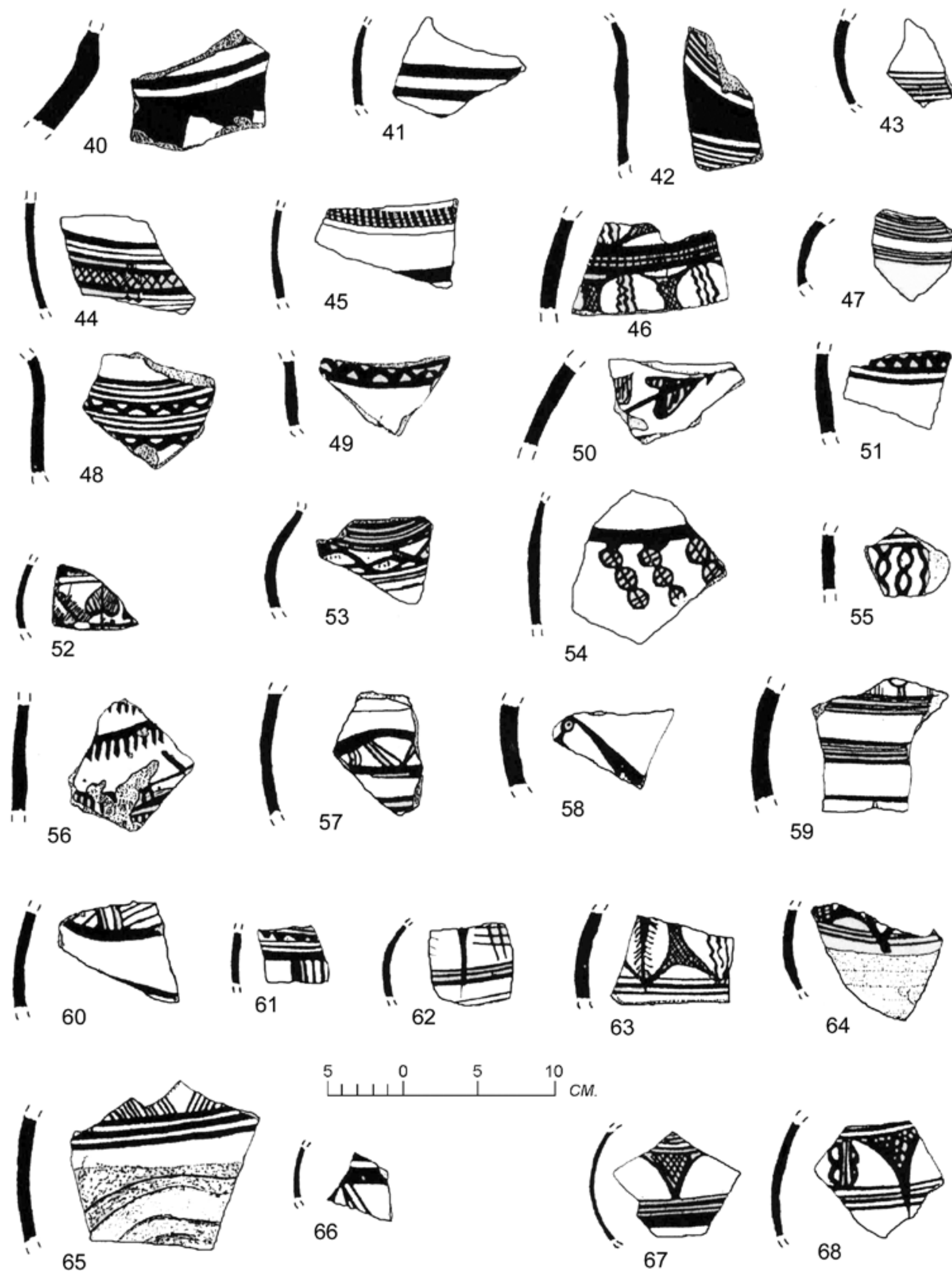


Fig.3. Harappan pottery: painted designs

Other Harappan Potteries (Figs. 4-8)

Fig. 4

1. Thick trough with a flat top and externally thickened rim. Of medium fabric and slight greyish core, it is well fired.

2. Dish with an out-turned projected rim and convex sides, slightly carinated below the rim. Of Medium fabric, it is well fired. One groove on the interior surface of the rim and four on the exterior are also visible.

3. Dish with an undercut rim and convex sides. Of medium fabric, treated internally with red slip.

4. Thick trough with a prominent beaked rim and almost straight sides. Of medium fabric, it is treated with red slip. A row of cord design is on the exterior.

5. Large bowl with an externally beaded rim and almost straight sides. Of medium fabric, treated externally with red slip.

6. Basin with a flat rim and convex sides. Of medium fabric and greyish core, it is devoid of any surface treatment.

7. Bowl with a slightly beaded rim and convex sides. Of medium fabric it is treated with red slip.

8. Basin with an obliquely out rim. Of fine fabric, it is treated with red slip.

9. Dish with a nail-headed rim forming a deep groove outside. Of medium fabric and greyish core, it is well-fired and devoid of any surface treatment.

10. Thick dish with a flat projected out-turned rim. Of medium fabric it is well-fired and devoid of any surface treatment.

11. Rim portion of the base of a dish-on-stand with an externally thickened rim. Of medium fabric, it is well-fired and treated externally with red slip. A thick horizontal band in black pigment is also visible on the outer side of the rim.

12. Dish with an out-turned featureless rim and convex sides. Of medium fabric, it is well-fired and devoid of any surface treatment.

13. Dish with a splayed out rim, convex sides and slightly carinated at the junction of base. Of coarse fabric, it is well-fired and devoid of any surface treatment.

14. Shallow dish with ring-stand with horizontally splayed out rim and slightly carinated outside. Of medium fabric, it is well-fired and treated both internally and externally with red slip.

15. Dish with an out-turned rim forming a deep groove externally. Of medium fabric, it is well-fired and devoid of any surface treatment.

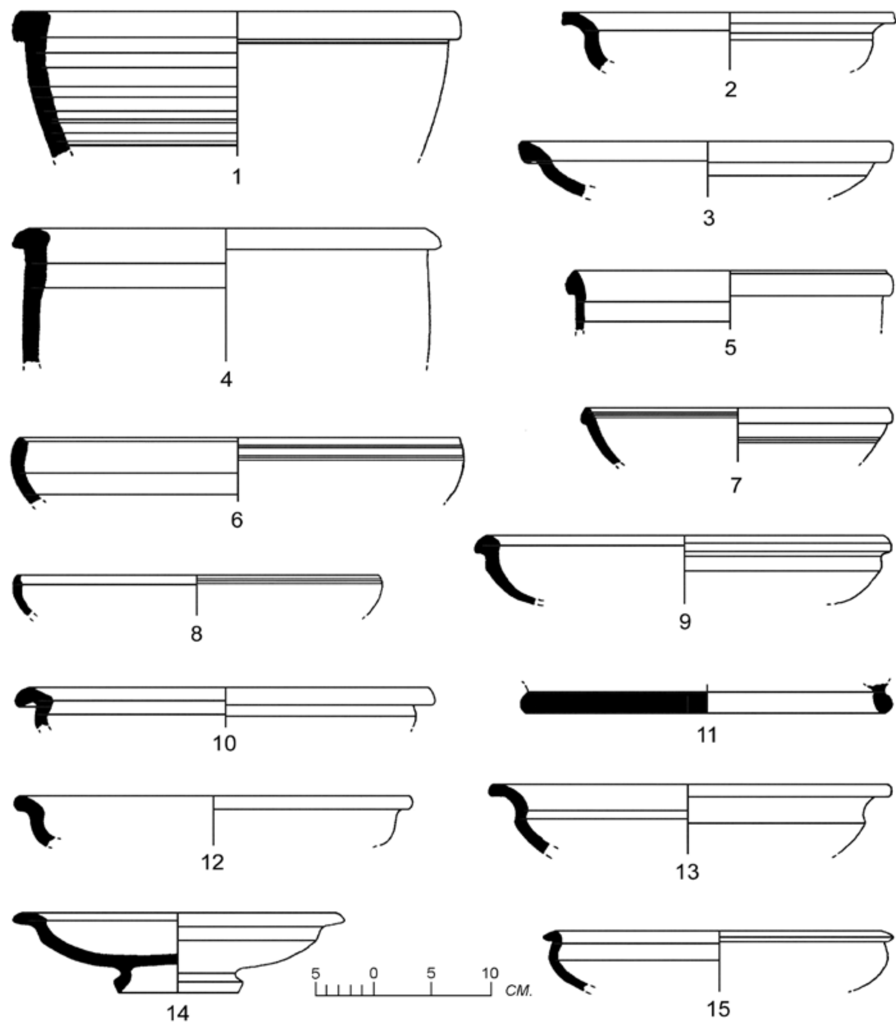


Fig.4. Harappan pottery

Fig. 5

1. Shallow dish of a dish-on-stand with a projected rim. Of medium fabric, greyish core, it is treated both externally and internally with red slip. Vertical strokes on the rim are also visible.

2. Thick dish of a dish-on-stand with drooping rim. Of medium fabric, it is treated both externally and internally with red slip. Paintings in black pigment with latticed design within two oblique strokes on the rim are slightly visible.

3. Thick dish of a dish-on-stand with a prominent drooping rim. Of medium fabric, it is devoid of any surface treatment.

4. Shallow dish of a dish-on-stand with out-turned projected rim. Of medium fabric, it is painted in black pigment over red slip with two groups of horizontal bands in the interior and oblique strokes within two horizontal bands on the rim. At the junction with stem one thick horizontal band on the exterior side is also visible.

5. Shallow dish of a dish-on-stand with an out-turned thickened rim. Of medium fabric, it is painted in black pigment over red slip with horizontal bands on the rim and inner side.

6. Shallow dish of a dish-on-stand with an out-turned projected rim. Of medium fabric, it is painted in black pigment over red slip with horizontal bands on the inner side and vertical strokes within two horizontal bands on the rim. Three horizontal bands at the junction with stem on the exterior are visible.

7. Base of dish-on-stand with externally beaded rim, of medium fabric, it is painted on the exterior in black pigment over red slip with thick horizontal bands.

8. Drum portion of dish-on-stand with prominent projected ridge. Of medium fabric, it is treated with red slip.

9. Base of dish-on-stand with a nail-headed rim. Of medium fabric, it is painted in the exterior side in black pigment over red slip with one thick horizontal band each on rim and body.

10. Shallow dish of dish-on-stand with an out-turned beaked rim. Of medium fabric, it is painted in black pigment over red slip with a row of diamonds within two horizontal bands on the rim. The diamonds bear oblique strokes.

11. Dish of a dish-on-stand with a drooping rim. Of medium fabric, it is painted in black pigment over red slip decorated with diamonds containing parallel vertical strokes and triangles formed by two vertical lines, above a horizontal band on the rim. The triangles further bear parallel vertical strokes.

12. Shallow dish of dish-on-stand with a drooping rim. Of medium fabric, it is treated with red slip on the interior side.

13. Large base of dish-on-stand with a beaded rim. Of medium fabric, it is painted in black pigment over red slip with thick parallel horizontal bands on the body and rim.

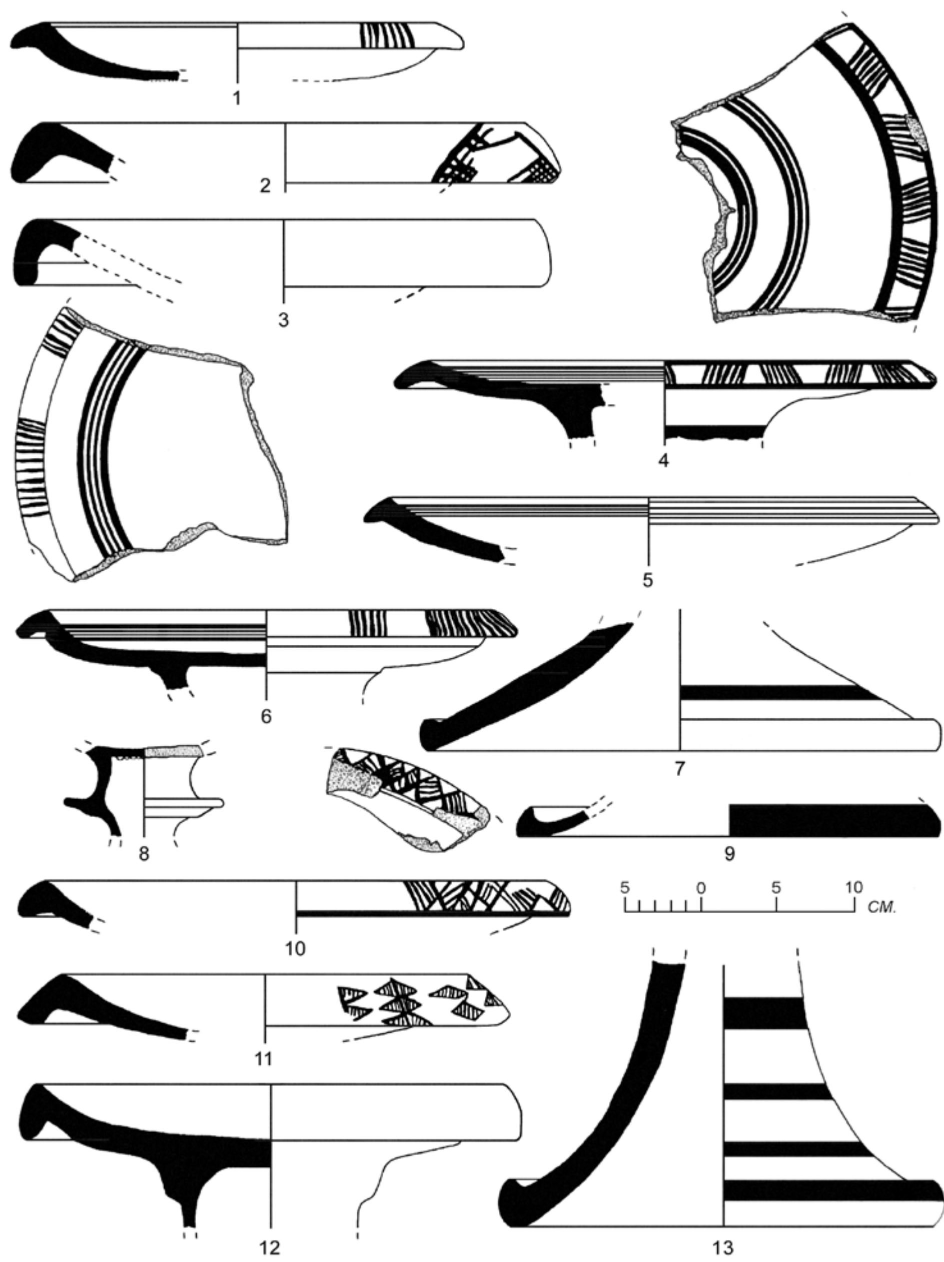


Fig.5. Harappan pottery

Fig. 6

1. Thick trough with an externally beaded rim and convex sides, slightly carinated below the rim. Of medium fabric, it is treated both externally and internally with micaceous red slip.

2. Cup with convex sides. Of fine fabric, it is treated externally with red slip. The body of the cup tapers towards the pedestal base.

3. Thick trough with a beaded rim and straight sides. Of medium fabric, it is treated externally with micaceous red slip.

4. Thick trough with beaded rim and almost straight sides. Of medium fabric, greyish core, it is devoid of any surface treatment.

5. Small cup with convex sides. Of fine fabric, it is treated externally with red slip. The body of the cup tapers towards pedestal base.

6. Large trough with a beaded rim and straight sides. Of medium fabric, it is devoid of any surface treatment.

7. Bowl with convex sides and slightly beaked rim. Of medium fabric, it is painted in black pigment over red slip with two horizontal bands.

8. Thick trough with an externally beaded rim and slightly tapering sides. Of medium fabric, it is devoid of any surface treatment.

9. Trough with an externally beaded rim and slightly convex sides. Of medium fabric, it is treated both externally and internally with red slip.

10. Bowl with a horizontally splayed-out rim and convex sides. Of medium fabric, it is devoid of any surface treatment.

11. Trough with a projected rim and slightly convex sides. Of medium fabric, it is devoid of any surface treatment.

12. Bowl with a horizontally splayed-out rim and convex sides. Of medium fabric, it is treated both externally and internally with red slip.

13. Deep trough with an externally beaded rim, convex profile and a collar below the rim. Of medium fabric, it is treated externally with red slip.

14. Trough with an externally beaded rim and slightly convex sides. Of medium fabric, greyish core, it has micaceous red surface.

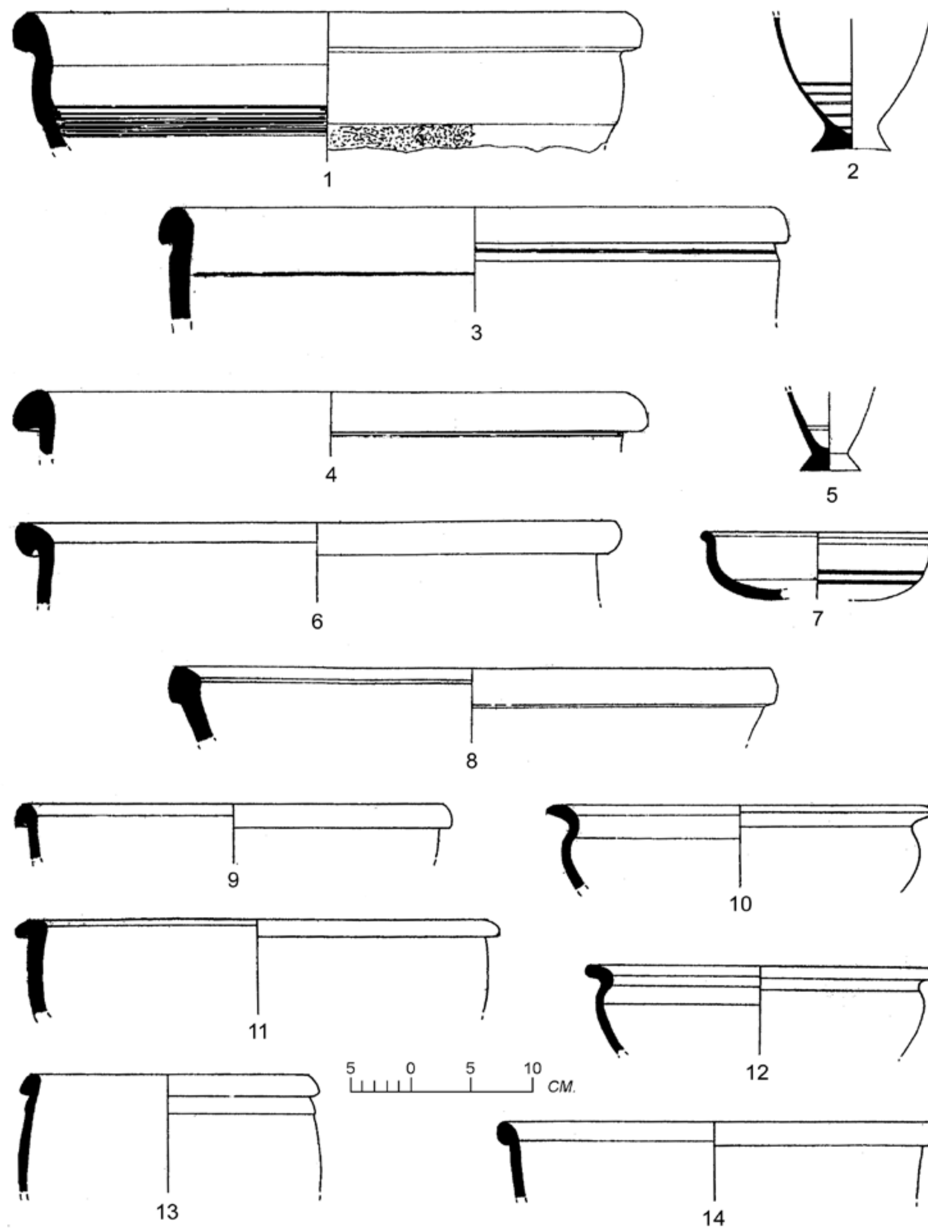


Fig.6. Harappan pottery

Fig. 7

1. Vase with an externally thickened rim and a concave neck. Of fine fabric, it is treated with a brown polished slip on the outside and the rim inside.

2. Jar with a horizontally splayed-out rim and a concave neck. Of fine fabric, it is painted in black pigment over red slip with a thick horizontal band on the neck.

3. Small vase with a beaded rim and spherical body. Of fine fabric, it is painted in black pigment over red slip with a broad horizontal band covering rim and neck. One band is also visible on the belly.

4. Small bowl with a horizontally projected rim, convex sides and flat base. Of fine fabric, it is treated internally with red slip.

5. Vase with an externally thickened rim and concave neck. Of fine fabric, it is painted in black pigment over red slip with one thick horizontal band on rim and two horizontal bands on the neck.

6. Jar with a horizontally splayed-out rim. Of medium fabric, it is treated both internally and externally with red slip and painted in black pigment on the exterior with a thin horizontal band on the rim and one horizontal band on the neck.

7. Vase with a beaded rim. Of fine fabric, it is treated with red slip and painted in black pigment with a broad horizontal band around rim and shoulder.

8. Small beaker with a beaded rim, convex body and flat base. Of fine fabric, it is treated externally with red slip and painted in black pigment with two horizontal bands.

9. Vase with an externally thickened rim and concave neck. Of fine fabric, it is painted in black pigment over red slip with one broad horizontal band on the neck and one thick horizontal band over the rim.

10. Jar with a horizontally splayed-out rim. Of medium fabric, it is treated internally with red slip.

11. Miniature goblet with a long pedestal base and elongated body of medium fabric, it is devoid of any surface treatment.

12. Miniature pot with featureless rim, convex sides and flat base. Of medium fabric, it is devoid of any surface treatment.

13. Miniature vase with concave neck, convex body and flat base having a hole in the centre. Of medium fabric, it is treated externally with red slip.

14. Miniature cup with featureless rim and the body tapering towards the pedestal base. Of fine fabric, it is treated internally with a red slip.

15. Miniature goblet with flaring rim and convex body joining the pedestal base. Of fine fabric, it is treated with red slip and bears four threaded grooves on the exterior.

16. Miniature cup with a flaring rim, tapering body and pedestal base. Of medium fabric, it is treated internally with red slip.

17. Vase with an externally beaded rim. Of fine fabric, it is treated with red slip and painted in black pigment on the rim and another horizontal band on the neck.

18. Vase with a nail-headed rim and concave neck. Of fine fabric, it is treated with red slip and painted in black pigment with a broad horizontal band covering rim.

19. Small bowl with a featureless rim and convex sides. Of fine fabric, it is treated with red slip and painted in black pigment with two thick horizontal bands on the exterior.

20. Goblet with a pedestal base having a hole in the centre. Of medium fabric, it is devoid of any surface treatment.

21. Miniature cup with an obliquely cut rim, tapering body and pedestal base of medium fabric it is devoid of any surface treatment.

22. Vase with an externally beaded rim of fine fabric, it is treated with red slip and painted in black pigment with one broad horizontal band covering rim.

23. Vase with a globular body and disc base. Of fine fabric, it is treated with dark red slip on the exterior and painted in black pigment with wavy lines and triangles having oblique strokes within horizontal bands. Two horizontal bands on the belly and one thick horizontal band on neck are visible.

24. Small vase with convex profile and prominent disc base. Of fine fabric, treated externally with red slip and painted in black pigment with fish-net motif within two thick horizontal bands. Two horizontal bands on the belly and one on neck are seen.

25. Small vase with convex profile and disc base. Of fine fabric, it is treated externally with red slip.

26. Small vase with an obliquely cut rim and concave neck. Of fine fabric, treated externally with red slip and painted in black pigment with a broad horizontal band covering rim and neck. One groove is also visible on the neck.

27. Small vase with an externally thickened rim and concave neck. Of fine fabric, it is treated with red slip and painted in black pigment with a broad horizontal band covering rim and neck. Another thin horizontal band is also visible on the neck.

28. Small dish with a beaked rim and convex sides. Of medium fabric, it is treated with red slip and painted in black pigment with vertical strokes within two thick horizontal bands on the rim.

29. Vase with an externally beaded rim and concave neck. Of fine fabric, treated externally with red slip and painted in black pigment with a thick and a thin horizontal band on the shoulder.

30. Knobbed lid with flat base and convex sides. Of medium fabric, it is treated externally with red slip.

31. Knobbed lid with horizontally splayed out rim, convex sides and slightly carinated at the junction of round base. Of medium fabric, it is devoid of any surface treatment.

32. Vase with an externally beaded rim and concave neck. Of fine fabric, externally it is treated with red slip and painted in black pigment with a thick horizontal band each on rim and neck.

33. Vase with an out-turned thickened rim and concave neck. Of fine fabric, it is treated with red slip and painted in black pigment with one thick horizontal band each on rim and neck.

34. Small vase with an out-turned featureless rim, concave neck and convex profile. Of fine fabric, it is treated externally with creamish slip and painted on the shoulder in black pigment with fish-net motif below a thick horizontal band.

35. Small bowl with a featureless rim, convex profile and disc base. Of fine fabric, it is devoid of any surface treatment.

36. Bowl of a featureless rim with convex sides and a ledge outside the rim. Of medium fabric, it is treated with red slip and painted in black pigment with one horizontal band on the rim and two on the body.

37. Vase with an externally beaded rim. Of fine fabric, it is treated with red slip and painted in black pigment with one broad horizontal band covering rim and neck.

38. Vase with concave neck and convex profile. Of fine fabric, it is treated with red slip and painted in black pigment with vertical and oblique strokes within a pair of horizontal bands.

39. Vase with globular body and ring base. Of fine fabric, it is treated externally with dark red slip.

40. Knobbed lid with a horizontally splayed out rim, convex profile and round base. Of medium fabric, it is treated both externally and internally with red slip.

41. Vase with an out-turned beaked rim and convex profile. Of medium fabric, it is treated with red slip on the outside and upto the neck on the inner side.

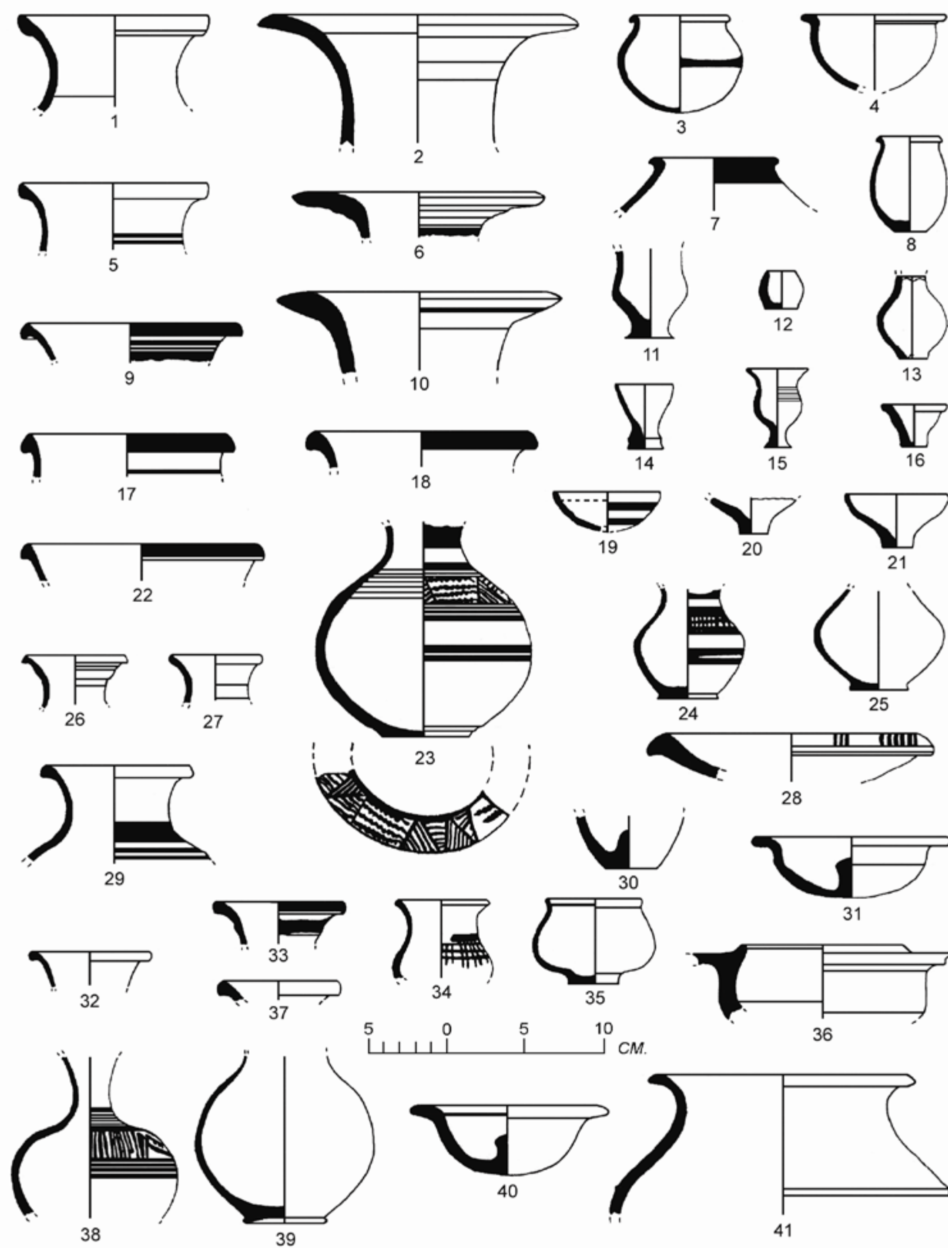


Fig.7. Harappan pottery

Fig. 8

1. Jar of red ware with a heavy beaded rim and flaring sides. Of gritty coarse fabric, it is treated with red slip on the outside.

2. Jar of red ware with an externally beaked rim and flaring sides. Of coarse fabric, it is painted in black pigment over red slip with thick vertical and oblique strokes within loops below a thick horizontal band on the shoulder.

3. Vase of red ware with externally beaded rim and flaring sides. Of fine fabric, it is painted in black pigment over red slip with a thick horizontal band on the shoulder.

4. Trough of red ware with an externally beaked rim. Of gritty coarse fabric, greyish core, it is devoid of any surface treatment.

5. Jar of dull red ware with slightly beaded rim and expanding. Of coarse fabric, slightly greyish core, showing mica in the paste, it is devoid of any surface treatment.

6. Jar of red ware with an internally bevelled rim, with a collar on the exterior and expanding sides. Of medium fabric, it is treated with red slip on the outside.

7. Vase of red ware with an externally lipped and cordoned rim with expanding sides. Of medium fabric, greyish core, it is treated with red slip on the outside.

8. Jar of red ware with an externally thickened rim and concave neck. Of medium fabric, it is treated with wash on the outside.

9. Jar of dull red ware with an externally beaked rim and concave neck. Of coarse fabric, showing mica in the paste, it is treated with wash on the outside.

10. Jar of red ware with an externally beaked rim. Of coarse fabric, it is painted in black pigment over red slip with one thick horizontal band each on the rim and shoulder.

11. Jar of pale red ware with an externally beaded rim and expending sides. Of coarse fabric slightly greyish core, it is devoid of any surface treatment.

12. Jar of red ware with an externally beaked rim. Of medium fabric, slightly greyish core, it is treated with red slip and painted in black pigment with one thick horizontal band on the rim and two on the shoulder.

13. Jar of red ware with a vertical thickened and externally undercut rim. Of medium fabric, greyish core, it is devoid of any surface treatment.

14. Lower portion of a stand with slightly thickened rim. Of gritty coarse fabric, it is devoid of any surface treatment.

15. Vase of pale red ware with an externally folded rim. Of medium fabric, slightly greyish core, it is treated both externally and internally with wash.

16. Jar of red ware with an externally beaded rim and concave neck. Of medium fabric, it is devoid of any surface treatment.

17. Lower portion of a stand with slightly thickened rim, slightly carinated on the outside. Of gritty coarse fabric, it is painted externally in black pigment over red slip with two thick horizontal bands.

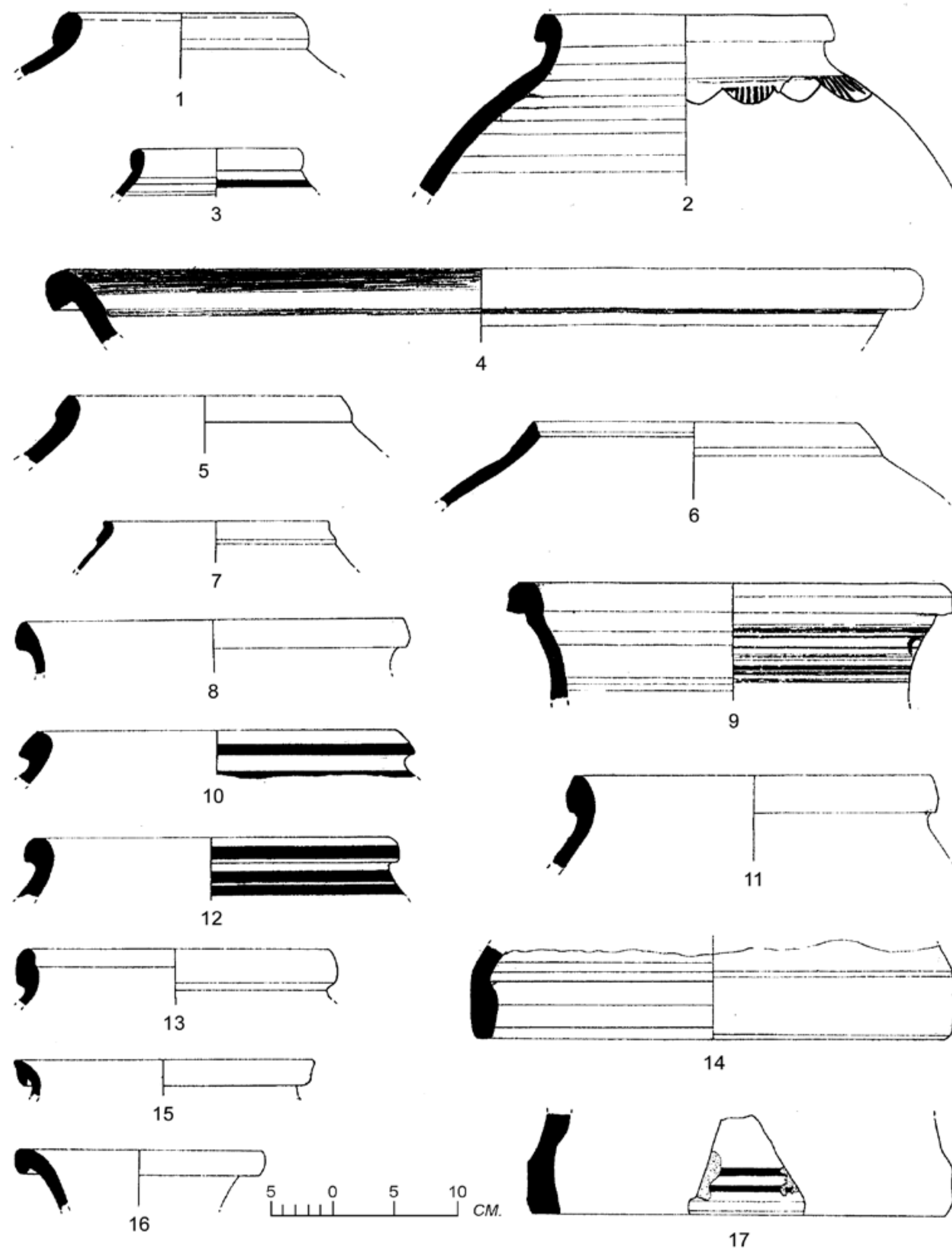
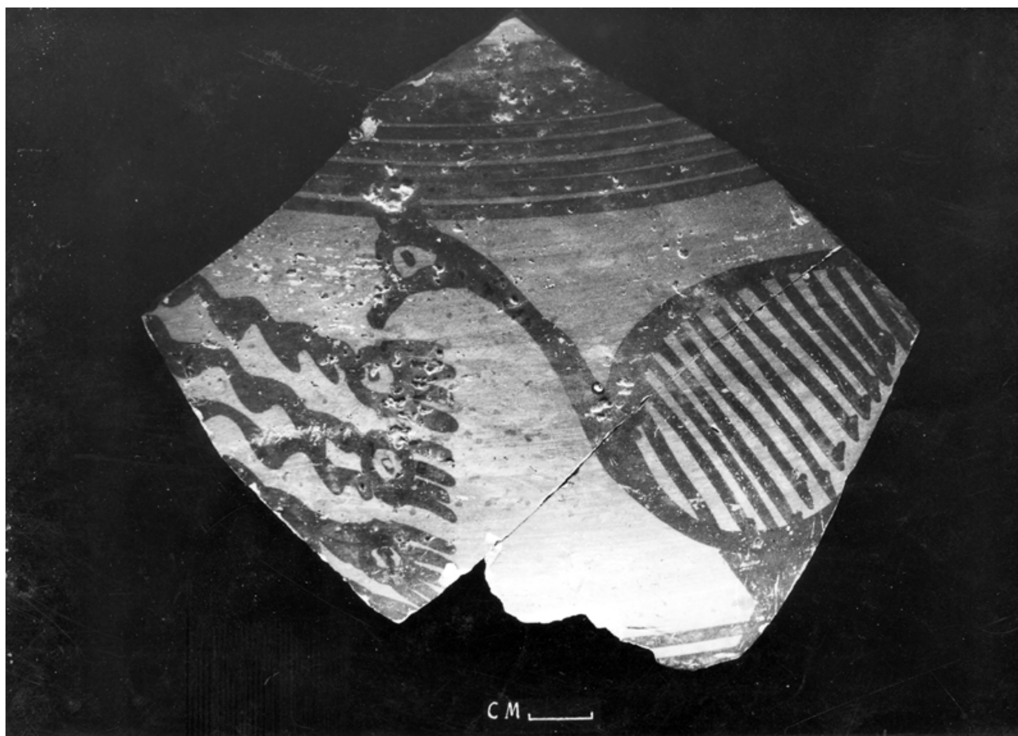
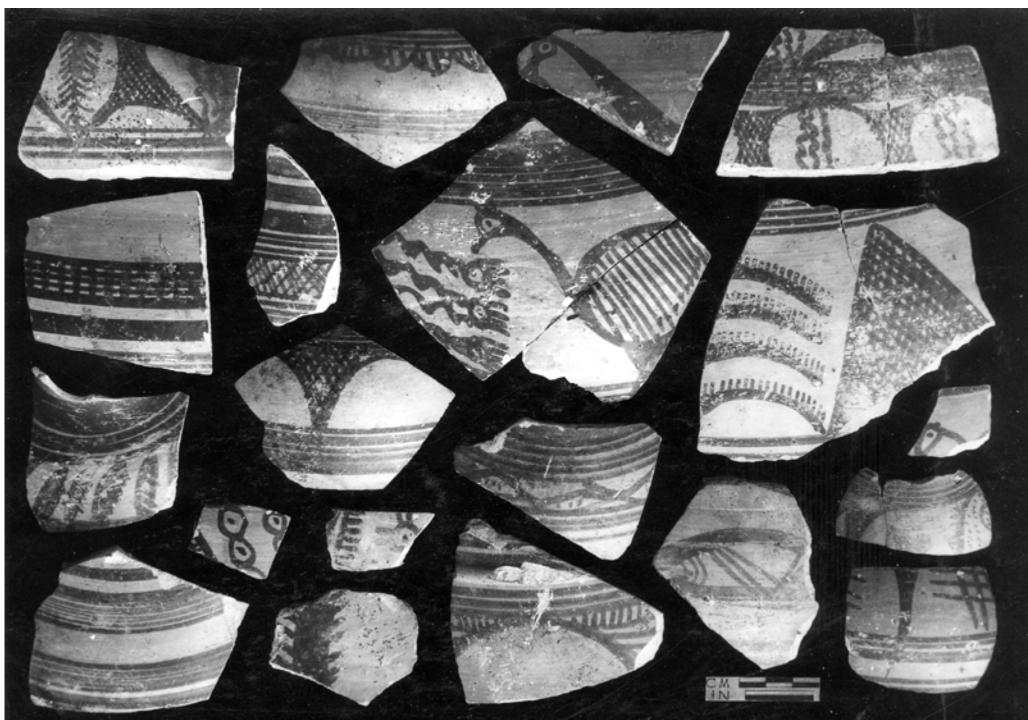


Fig.8. Harappan pottery

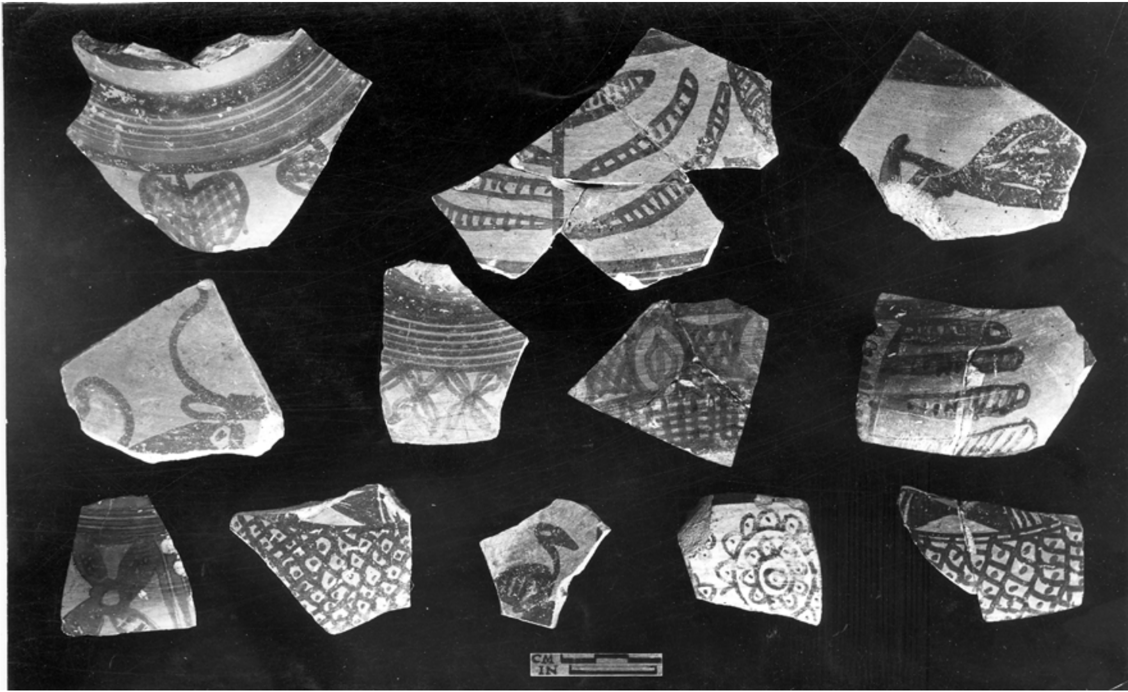
Plates



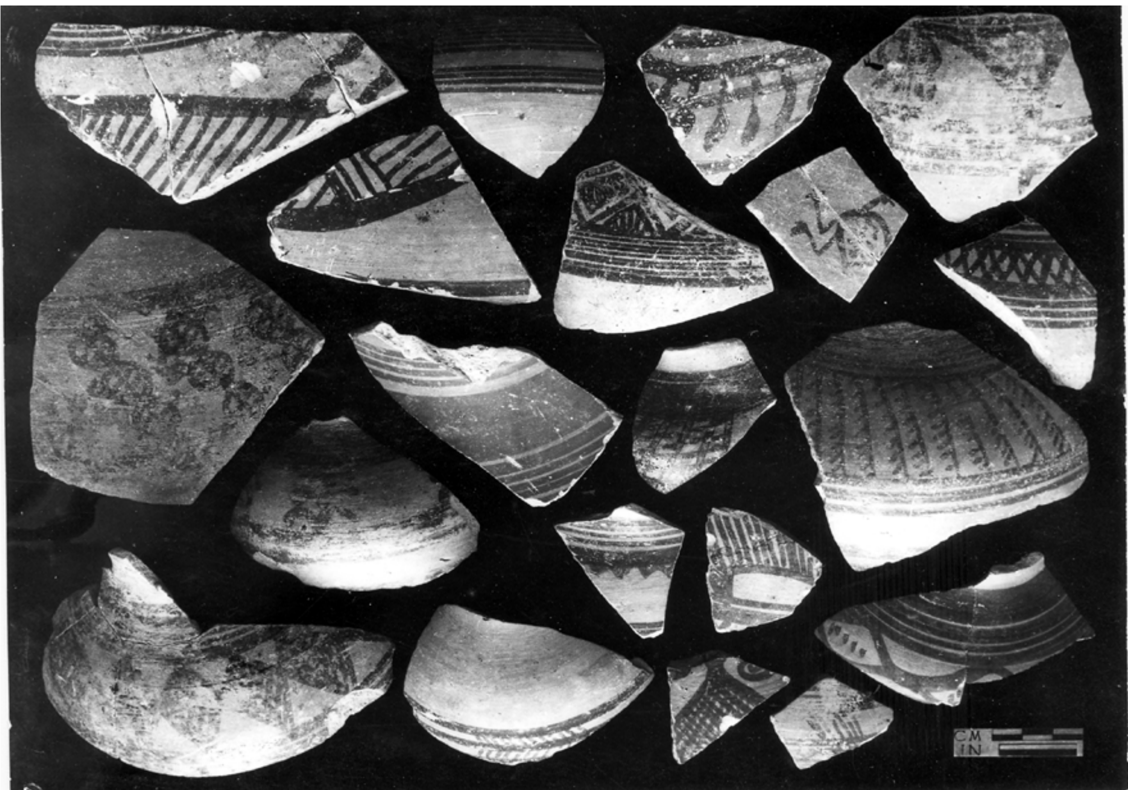
Pl. I. Peacock motif on Harappan potsherd



Pl. II. Painted Harappan potsherds



Pl. III. Painted Harappan potsherds



Pl. IV. Painted Harappan potsherds



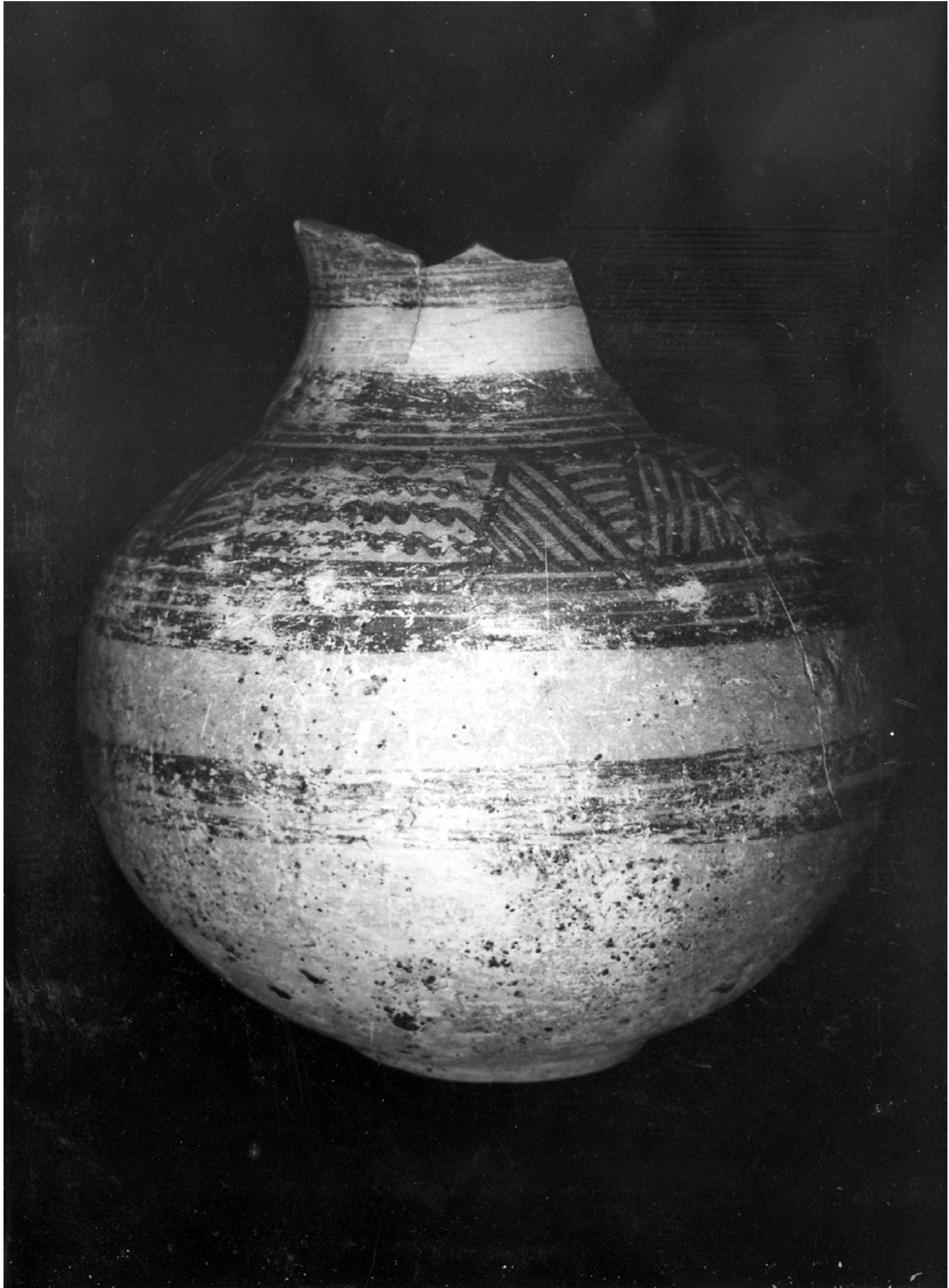
Pl. V. Potsherd decorated with incised wavy lines



Pl. VI. Harappan knobbed lid cum bowl and pot



Pl. VII. Painted Harappan Vase



Pl. VIII. Painted Harappan Vase



Pl. IX. Painted Harappan Vase



Pl. X. Painted Harappan Vase

PERIOD II

The Painted Grey Ware (hereafter PGW) distinguished itself with all of its typical features right from clay paste up to firing, as the finest of all other ceramic industries of Period II. During the last decade, the PGW has been collected from large number of explored and excavated sites of north-western and northern India.

In addition to the most common shapes like bowl and dish, a few shapes of string-cut tapering sided bowl (Fig. 9, No. 4, 5), knobbed lid (Fig. 18, No. 55) and a fragment of a necked pot (Fig. 10, No. 8) were found.

The well-levigated clay produced varieties of fine, medium and coarse fabric in this ware. While the paste was totally devoid of any tempering materials, the surface contained mica particles in most of the cases. A mixed technique of partly wheel-thrown and partly hand modelling was applied in most of the cases for rendering the shapes except a very few evidence of using either of the two. Generally, the striation marks were smoothened by a wet self-slip while the pot was on the wheel. A thin grey wash sometimes in more dark grade like blackish was used on some dry pots as the final touch of pre-firing surface treatment. The pigment used for painting was most probably prepared from clay body. Normal firing was grey, producing metallic sound in respect of this ware though red firing was not rare.

The painted designs were mostly alike to geometrical patterns though sometimes produced the floral effect due to its arrangements. The convention of crud degeneration is not seen at Hulas as the crude and fine paintings were found executed simultaneously.

The designs are classified as under:

1. Simple horizontal and vertical bands (Fig. 9, No. 1-3)
2. Strokes in group (Figs. 9 and 10, No. 4-8)
3. Hooks (Fig. 10, No. 9-11)
4. Bands and strokes with dots (Figs. 10 and 11, No. 12-15, 19)
5. Semi –circles (Fig. 11, No. 17)

   (5a) Semi-circles with wavy lines (Fig. 11, No. 16)

   (5b) Concentric semi-circles (Fig. 11, No. 18)

(5c) Concentric semi-circles with dots (Figs. 12 and 13, No. 20, 23, 25)

(5d) Concentric semi-circle with dots and uprights (Figs. 12 and 13, No. 21, 27)

(5e) Concentric semi-circles with vertical wavy lines (Fig. 12, No. 22)

(5f) Concentric semi-circles around a circle (Fig. 13, No. 26, 28)

6. Loops (Fig. 14, No. 29)

   (6a) Loops forming a chain (Fig. 14, No. 30-32)

   (6b) Intersecting loops (Fig. 15, No. 33-36)

   (6c) Eye-shaped loops with dots (Fig. 15, 16, No. 38, 43)

   (6d) Petal-shaped loops with dots

   (i) in twin form (Fig. 16, No. 40)
   (ii) in diagonal manner (Fig. 16, No. 40)
   (iii) in trilobite form (Fig. 16, No. 41)
   (iv) in radial manner (Fig. 16, No. 42-44, 45)

7. Concentric circles and circles with dots and strokes (Fig. 17, No. 46-48)

8. Spiral (Fig. 17, 18, No. 49-52)

9. Cross (Fig. 18, No. 53-54)

10. Sigma (Fig. 18, No. 55-57)

11. Chevron (Fig. 18, No. 58)

The selected specimens are described as below **(Figs. 9-20; Pls. XI-XIX):**

Fig. 9

1. Bowl with an oval-collared rim, convex sides relieved by prominent grooves, of medium fabric and surface treatment contains mica particles. Painted in black and designs comprise horizontal bands on either side of lip and exceptionally thick vertical bands emanated from lip band on inner side. From Period II.

2. Bowl with bud-shaped rim is of medium fabric and surface treated with wash. Painted in black, the designs comprise horizontal bands on either sides of the lip. From an early level of Period II.

3. Bowl with featureless rim and steep sides carinated to sagger base, it is of medium fabric and wash treated surface contains mica particles. Painted in black, the designs comprise simple horizontal bands on either sides of lip and overflowing excess pigment of the lip band forms an oblique line on inner surface. From lower level of Period II.

4. String-cut flat base of a bowl with sides tapering down, of medium fabric and surface devoid of any treatment contains mica and bears prominent striation marks on inner side. Black painted designs comprise irregular shaped strokes in a group of five arranged in radial manner of cross. From late level of Period II.

5. Variant of type 4. It is of fine fabric and surface treated with wash contains mica particles. Black painted designs comprise strokes in a group of three arranged in the same manner as above. From late level of Period II.

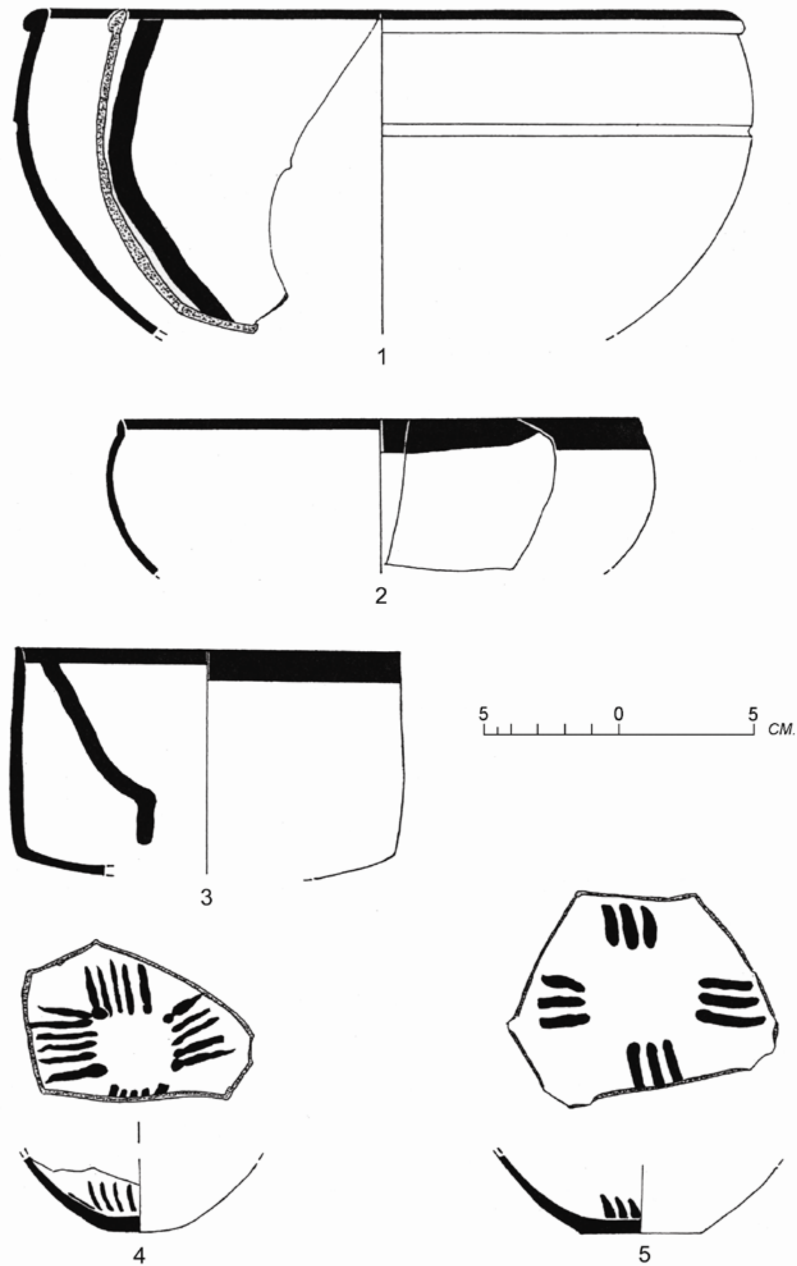


Fig.9. Painted Grey Ware (Pd II)

Fig. 10

6. Bowl with featureless rim and steep sides is of medium fabric and surface treated with wash contains mica grains. Painted in black, the designs comprise horizontal bands on either side of lip followed by one group of thick-headed strokes forming a column on the exterior while another arranged vertically on the inner surface. From a pit of Period II.

7. Bowl with bud-shaped rim and rounded sides is of medium fabric and surface treated with wash contains horizontal bands on either side of the lip followed by a group of oblique strokes on outer surface and two parallel vertical strokes emanating from lip-band on the inner side. From a pit of Period II.

8. Neck fragment of a bottle-shaped pot with featureless rim and profile relieved by grooves is of fine fabric and surface treated with wash, contains mica particles. Painted in black and design comprises horizontal band on either side of the lip followed by groups of irregular shaped vertical strokes on outer surface. From an early level of Period II.

9. Dish with incurved rim and gently tapering sides carinated to sagger base is of fine fabric and surface treated with wash. Painted in black, the designs comprise of horizontal band on either sides of lip followed by twin hooks separated by a thick-end stroke on the exterior and a group of thick-end strokes emanated from lip-bank on inner surface. From a middle level of Period II.

10. Base fragment probably of a dish is of medium fabric and surface treated with wash contains mica particles. Painted in black design comprises hooks in each group of two arranged in the form of diagonal cross. From a late level of Period II.

11. Bowl with collared rim and convex sides is of fine fabric and surface treated with wash contains mica particles. Painted in black, the designs comprise horizontal bands covering either sides of lip followed by groups of hook and pellet-headed strokes arranged in imbricated manner producing an effect of wing on outer surface. From a middle level of Period II.

12. Bowl with an everted rim is of medium fabric and surface treated with wash contains mica particles. Painted in black, the designs comprise couple of vertical strokes emanated from horizontal lip-band on inner side and a group of three painted horizontal strokes on outer surface. From a late level of Period II.

13. Bowl with slightly everted rim and steep sides is of fine fabric and surface treated with wash contains mica particles. Painted in black, the designs comprise horizontal bands covering both sides of lip followed by three horizontal parallel bands filled with dots. From an early level of Period II.

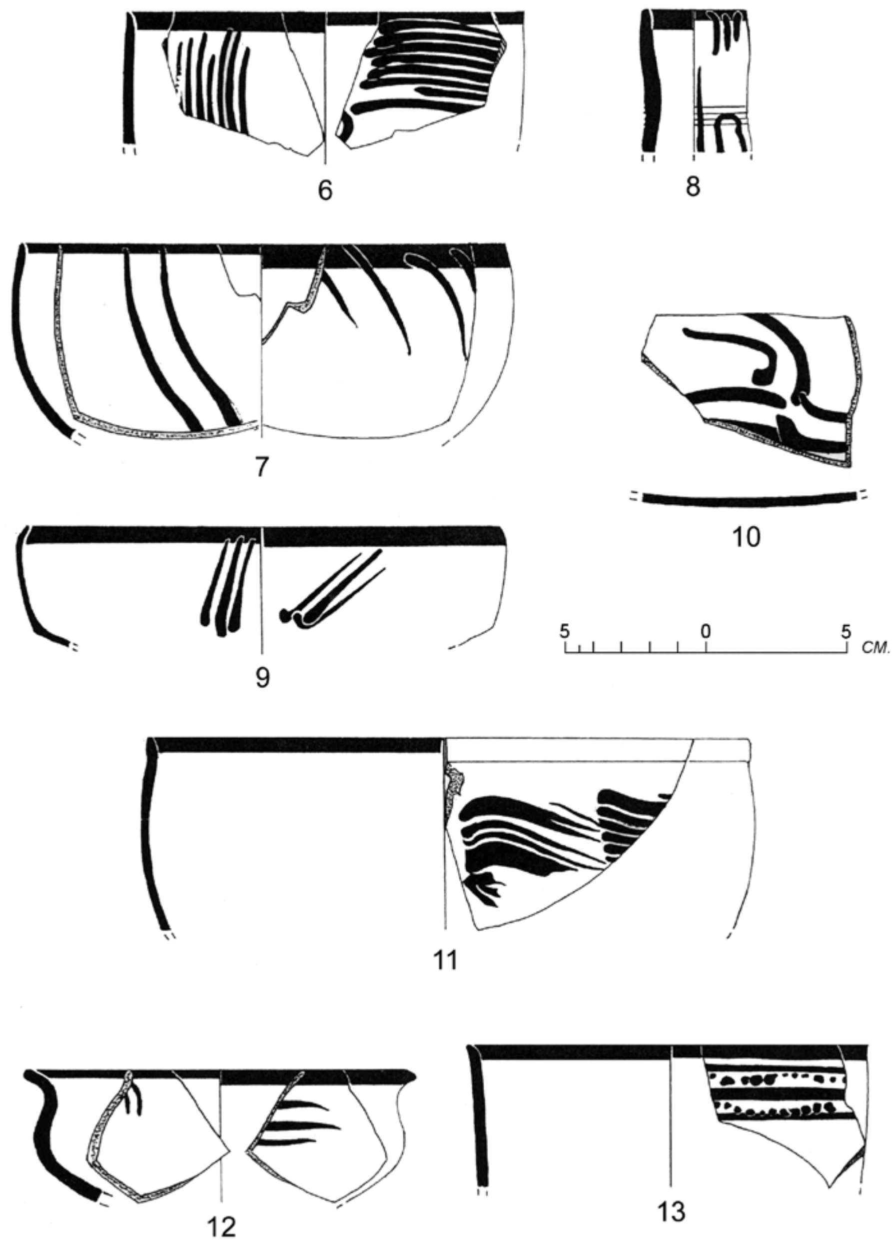


Fig.10. Painted Grey Ware (Pd II)

Fig. 11

14. Bowl with an out-curved beaded rim, carinated shoulder, profile relieved by minute grooves and flattish base and surface treated with wash. Almost the entire inner surface is filled with black painted intersecting strokes and dots arranged in irregular manner. From a pit of Period II.

15. Base fragment of a sagger-base dish is of medium fabric and surface treated with wash contains mica. Painted in black, the designs comprise group of parallel strokes filled with dots arranged vertically and horizontally. From middle level of Period II.

16. Base fragment of a dish is of medium fabric and surface treated with wash contains mica particles. Painted in black, the designs comprise group of semi-circular strokes followed by parallel wavy lines. From a pit of Period II.

17. Base fragment of a dish is of fine fabric and surface treated with wash contains mica particles. Painted in black, the designs comprise extraordinary thick interconnected semi-circular strokes. From late level of Period II.

18. Base fragment of a dish is of medium fabric and surface treated with wash contains mica particles. Painted in black, the designs comprise concentric semi-circles followed by group concentric semi-circles probably arranged in radial manner. From a pit of Period II.

19. Dish with featureless rim and rounded sides is of fine fabric and surface treated with wash contains mice particles. Painted in black, the designs comprise columns of horizontal strokes followed by irregular solid dots. From late level of Period II.

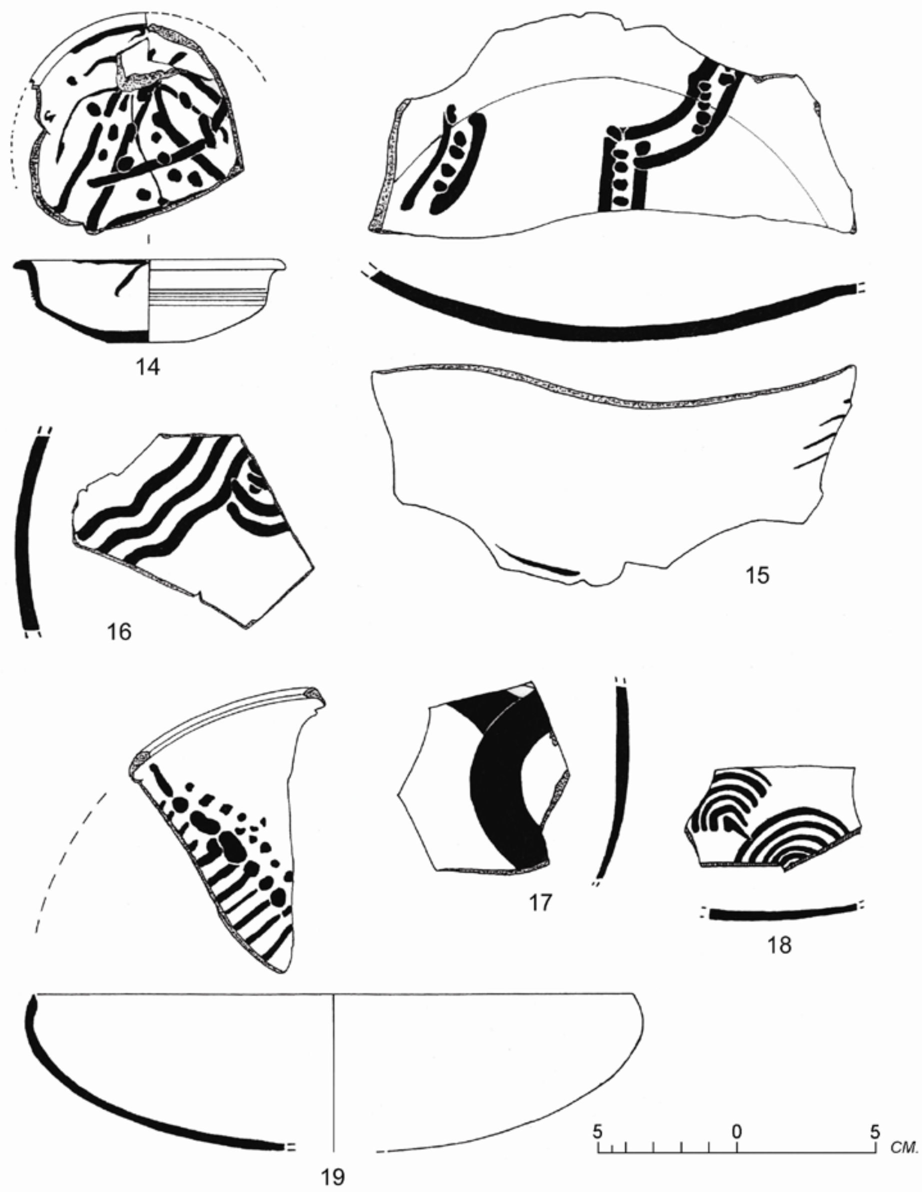


Fig.11. Painted Grey Ware (Pd II)

Fig. 12

20. Dish with an inturned rim and convex sides carinated to flattish base is of fine fabric and surface treated with wash shows husk impressions. Painted in black, the designs restricted to interior comprise horizontal bands on lip and groups of concentric semi-circles in circular form at the centre. From a pit of Period II.

21. Dish with featureless rim and rounded sides is of fine fabric and surface treated with wash contains mica particles. Painted in black, the designs comprise horizontal band on either sides of lip followed by group of oblique strokes on outer surface and uprights with solid dots bracketed by groups of concentric semi-circles on the inner surface. From middle level of Period II.

22. Bowl with an everted rim and rounded sides is of fine fabric and surface treated with wash contains mica particles. Painted in black, the designs comprise group of thick-headed oblique strokes on the exterior emanated from horizontal lip-band and a group of parallel wavy lines vertically follow concentric semi-circles. From a pit of Period II.

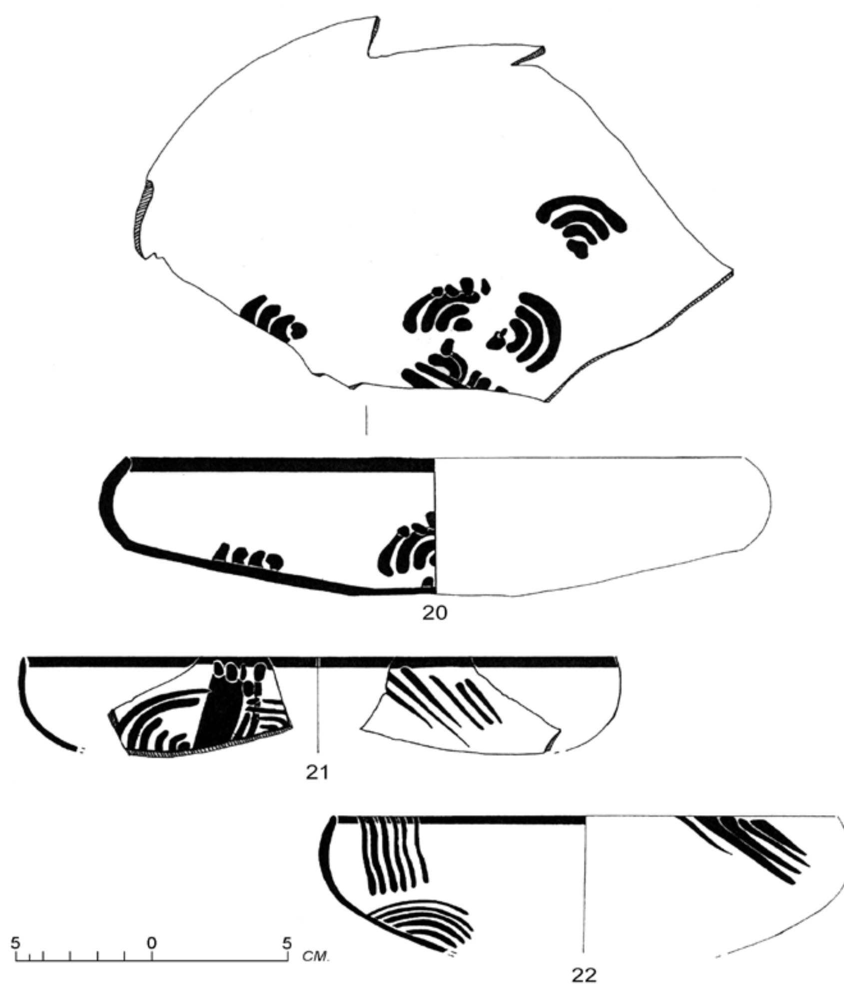


Fig.12. Painted Grey Ware (Pd II)

Fig. 13

23. Dish with an everted rim and rounded sides is of fine fabric and surface treated with wash contains mica particles. Painted in black, the design comprises group of semi-circles with solid dots. From a middle level of Period II.

24. Middle portion of a bowl with its profile relieved by grooves is of medium fabric having the surface treated with wash. Painted in black, the designs comprise column of concentric semi-circles intersected by oblique bands of oval shaped solid dots on outer surface, and a group of uprights on inner side. From an early level of Period II.

25. Base fragment probably of a dish is of medium fabric having the surface treated with wash. Painted in black, the designs comprise concentric semi-circles followed by groups of irregular shaped strokes at intervals on inner side. From a late level of Period II.

26. Base fragment of a bowl showing paring marks outside, it is of fine fabric having the surface treated with wash. Painted in black, the designs of inner side comprise concentric semi-circles with dots at the centre arranged in radial manner around the concentric circles. From a middle level of Period II.

27. Bowl with an everted rim, steep sides and profile relieved by grooves is of fine fabric and the surface treated with wash contains mica particles. Painted in black, the designs comprise horizontal bands on either sides of lip, and columns of concentric semi-circles, circles separated by groups of uprights with dots outside, and overflow of pigment from inner slip band. From an early level of Period II.

28. Base of a dish is of fine fabric and surface treated with wash contains mica particles. Painted in black, the design on inner surface comprises similar to No. 26 as variant. From an early level of Period II.

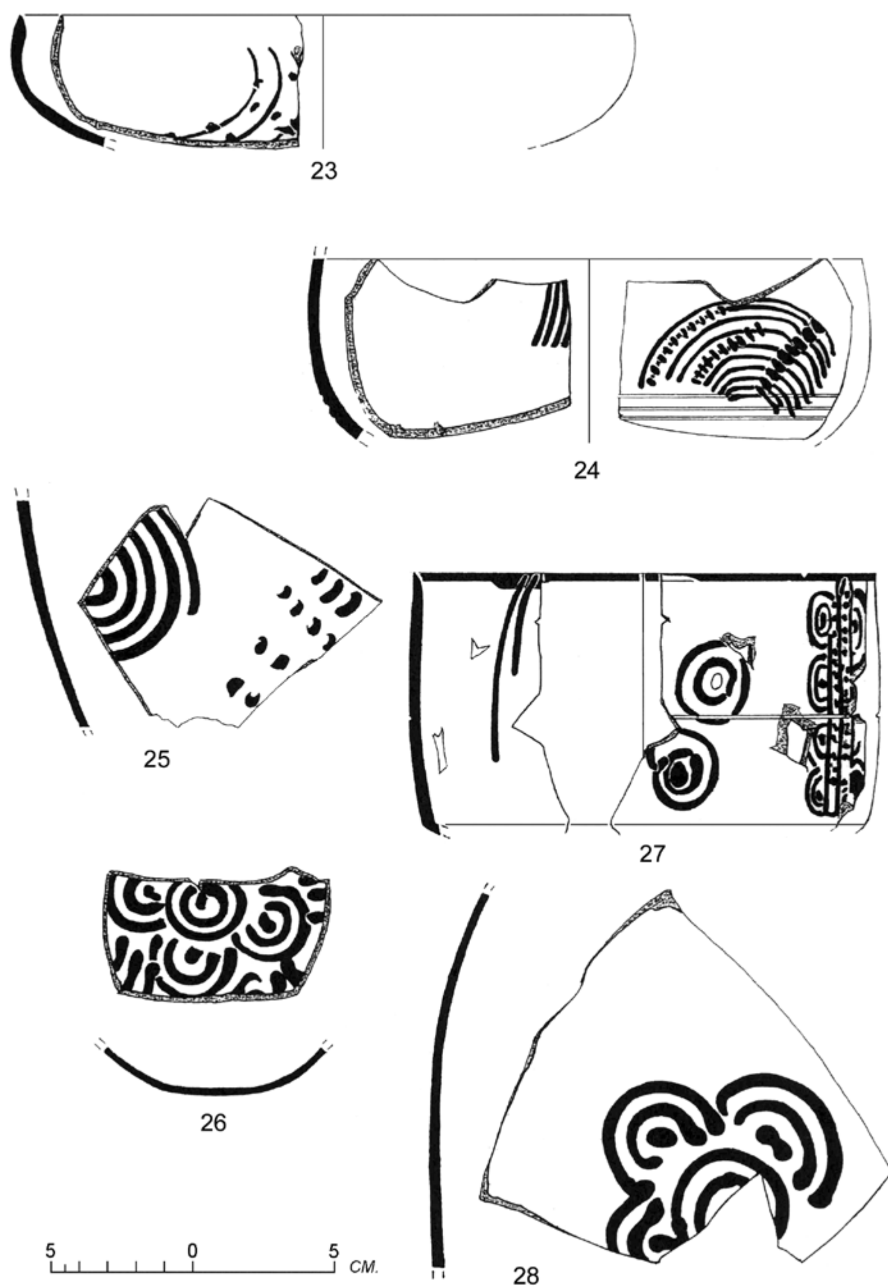


Fig.13. Painted Grey Ware (Pd II)

Fig. 14

29. Bowl with levelled rim and convex sides is of fine fabric and surface treated with wash contains mica particles. Painted in black, the design comprises horizontal bands on either side of lip and row of loops on the outer surface. From late level of Period II.

30. Base fragment probably of a flattish-base dish is of fine fabric having surface treated with wash. Painted in black inside, the central design comprises of chain of loops. From middle level of Period II.

31. Base fragment probably of a dish is of medium fabric and surface treated with wash contains mica particles. Painted in black on inner surface the designs comprise chains of overlapping loops. From late level of Period II.

32. Dish with featureless rim and convex sides carinated to sagger base is of medium fabric and surface treated with wash contains mica particles. Painted in black inside centre the design comprises chains of loops arranged in circles in imbricated manner. From a pit of Period II.

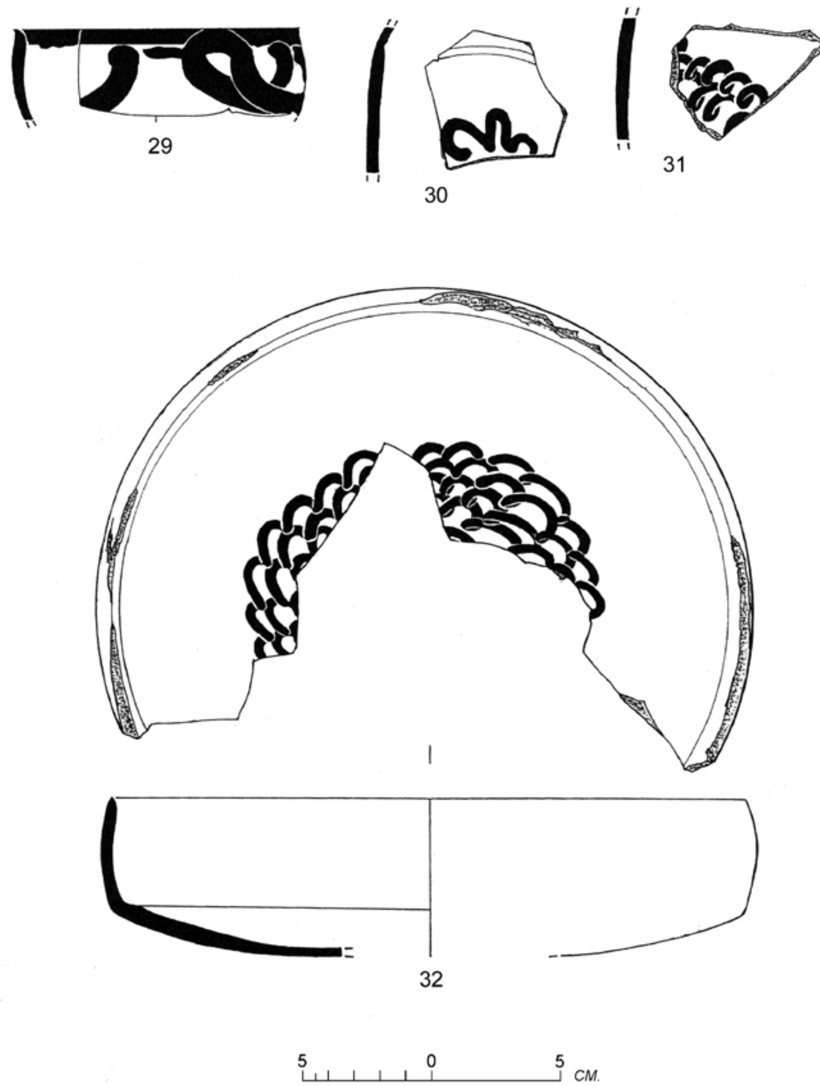


Fig.14. Painted Grey Ware (Pd II)

Fig. 15

33. Bowl with featureless rim and convex sides is of fine fabric and surface treated with dark grey wash contains mica particles. Painted in whitish looking pigment on outer side, the designs comprise intersecting loops forming a couple of columns. From a pit of Period II.

34. Fragment of a sagger based dish is of medium fabric and surface treated with wash contains mica particles. Painted in black on inner surface, the designs comprise intersecting loops followed by a group of thick-headed strokes. From middle level of Period II.

35. Dish with an incurved rim and convex sides is of medium fabric and surface treated with wash contains mica particles. Painted in black the designs comprise horizontal band on the interior of lip followed by groups of intersecting loops. From an early level of Period II.

36. Fragment of a sagger based dish is of medium fabric and surface treated with wash. Painted in black the design comprises intersecting loops filled and followed by oval shaped dots. From an early level of Period II.

37. Bowl with an everted rim and steep sides are of fine fabric having the surface treated with dark-greyish wash. Painted in black the designs comprise petal shaped loops filled with dots clenched to a upright on the exterior, and group of strokes with thick painted head on inner surface. From a pit of Period II.

38. Bowl with featureless rim and steep sides is of fine fabric and surface treated with wash contains mica particles. Painted in black the design comprises horizontal bands convering either side of lip and eye-shaped loop within followed by rows of dots. From an early level of Period II.

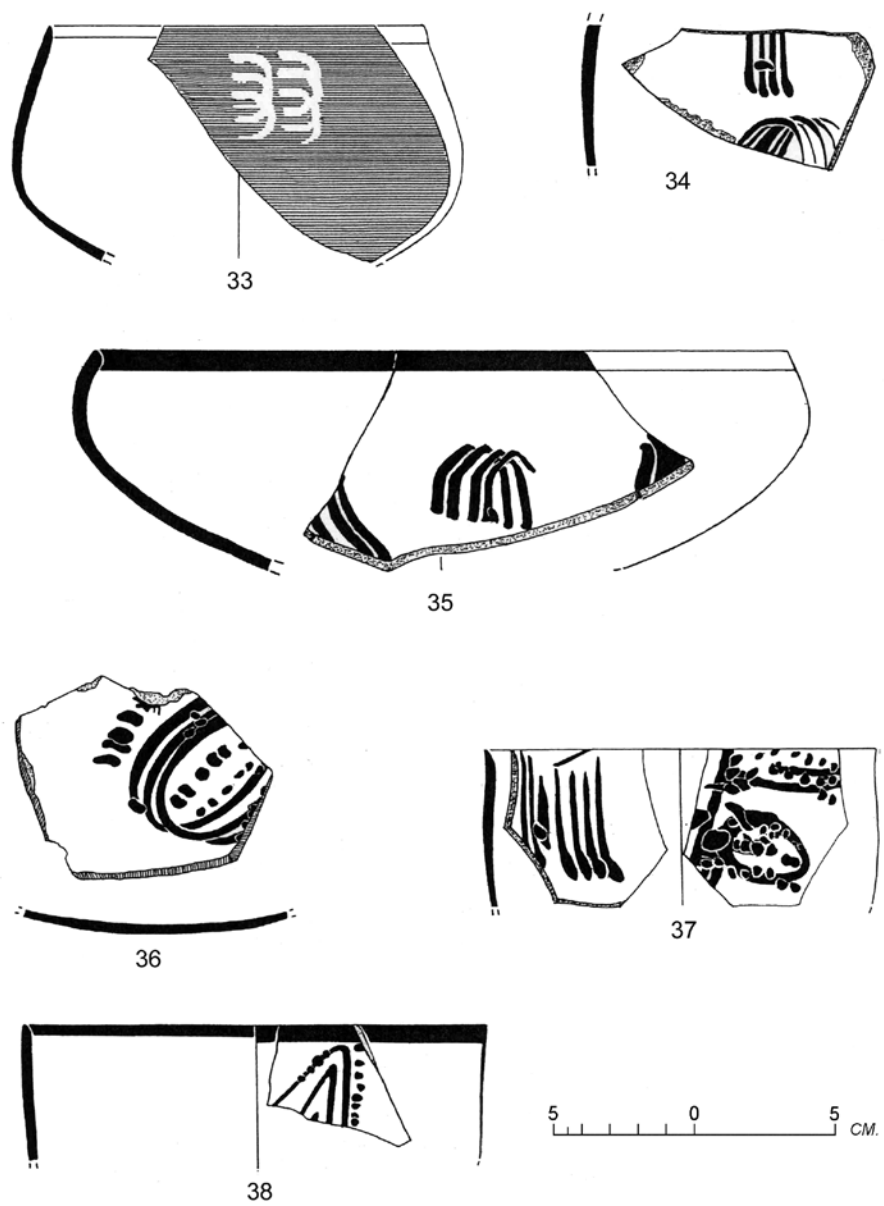


Fig.15. Painted Grey Ware (Pd II)

Fig. 16

39. Bowl with an everted rim and steep sides is of medium fabric and surface containing mica particles is treated with wash. Painted in black the designs comprise horizontal band on inner side of lip, and twin loops in petal shape filled with dots on the exterior. From a middle level of Period II.

40. Bowl with an everted rim and steep sides, it is of medium fabric and surface treated with wash. Painted in black the designs comprise horizontal bands on both the sides of lip and couple of petal-shaped loops filled with dots and arranged diagonally separated by the horizontal band. From a pit of Period II.

41. Fragment of a round based dish is of fine fabric and surface treated with wash contains mica particles. Designs painted in black at centre inside comprises trilobite of petal shaped loops filled with dots. From a late level of Period II.

42. Bowl with an everted rim, steep sides having the profile relieved by grooves is of fine fabric and surface treated with wash contains mica particles. Painted in black the design comprises horizontal bands on both the sides of lip followed by petal-shaped loops filled with dots attached to the either side of concentric circles and semi-circles on the exterior, and a group of intersecting loops on the interior. From a pit of Period II.

43. Base fragment probably of a dish is of medium fabric having the surface treated with wash. Design on the middle of the inner side, painted in black, comprises petal-shaped loops with short strokes arranged in radial manner around the concentric circles with dotted centre. From a pit of Period II.

44. Fragment probably of a dish is of fine fabric and surface treated with wash contains mica particles. Painted in black at the inside centre the design comprises petal-shaped loops filled with dots encircled in radial manner, the concentric semi-circles forming circles. From a pit of Period II.

45. Variant of No. 44 with a black-painted vertical column on the exterior.

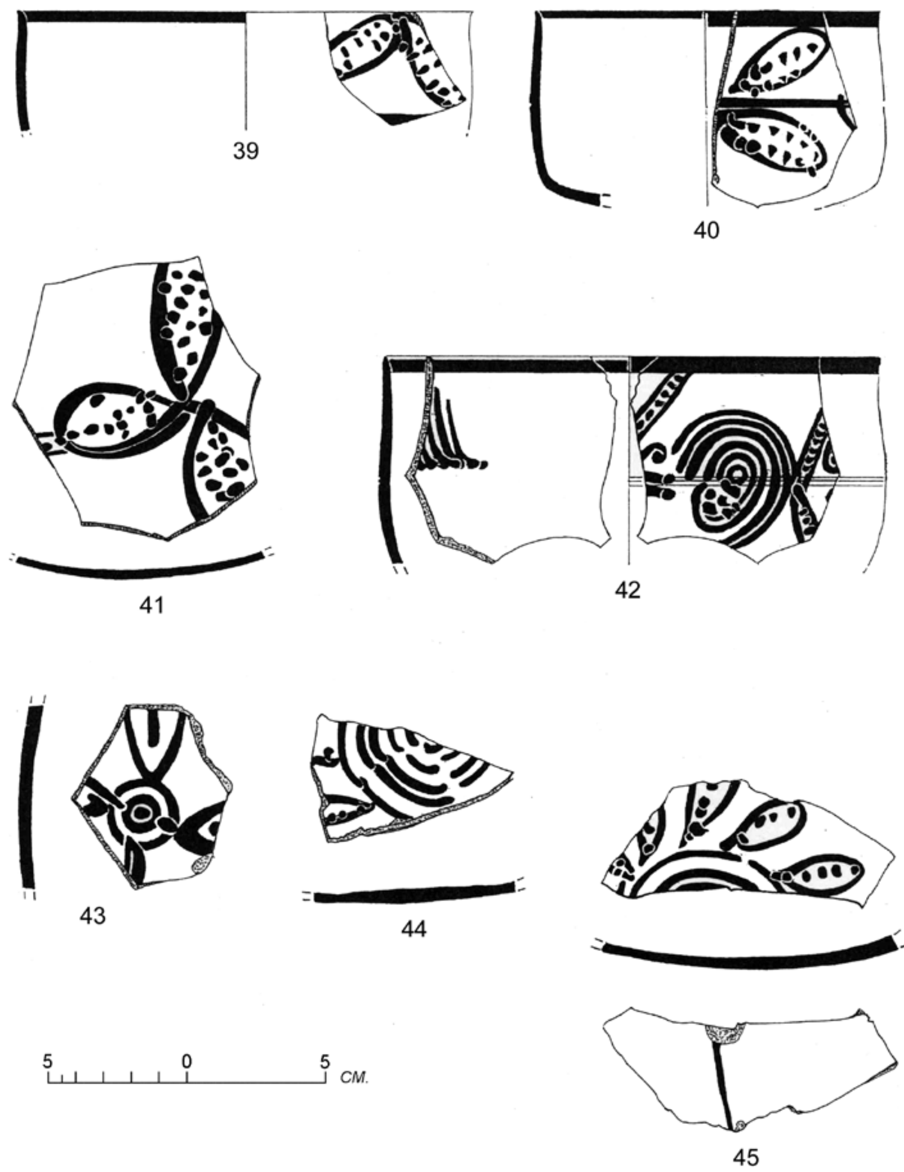


Fig.16. Painted Grey Ware (Pd II)

Fig. 17

46. Bowl with an everted rim and steep sides are of fine fabric and surface treated with wash. Painted in black the designs comprise horizontal bands on either sides of lip followed by circles with dot enclosed by column of horizontal strokes and concentric semi-circles on the exterior. From a late level of Period II.

47. Bowl with an everted rim, steep sides having the profile relieved by grooves is of fine fabric and surface treated with wash contains mica particles. Painted in black the designs comprise horizontal band on either sides of lip followed by a column of concentric circles winged by parallel lines with dots on the exterior, and groups of intersecting hooks on the inner side. From a middle level of Period II.

48. Bowl with levelled rim and steep sides is of medium fabric and surface treated with wash contains mica particles. Painted in black the designs comprise horizontal bands on either sides of lip followed by concentric circles with the wings of parallel arcs and strokes filled with dots on the exterior, and a flange headed thick vertical on the inner side. From a pit of Period II.

49. Mid fragment of a vessel is of fine fabric having the surface treated with wash. The design on inner surface painted in black, comprises chains of spirals arranged in overlapping circles enclosed to a band. From a middle level of Period II.

50. Mid fragment probably of a bowl is of medium fabric and surface treated with wash contains mica particles. Painted in black the designs comprise spirals arranged in radial manner around a circle on the outer surface, and a couple of parallel strokes on the inner side. From a pit of Period II.

51. Dish with an everted rim and rounded sides is of fine fabric and surface treated with wash contains mica particles. Painted in black the designs comprise horizontal band on the either side of lip followed by a group of oblique strokes on the exterior, and spirals enclosed by parallel lines and boat-shape with dots on the inner surface. From a pit of Period II.

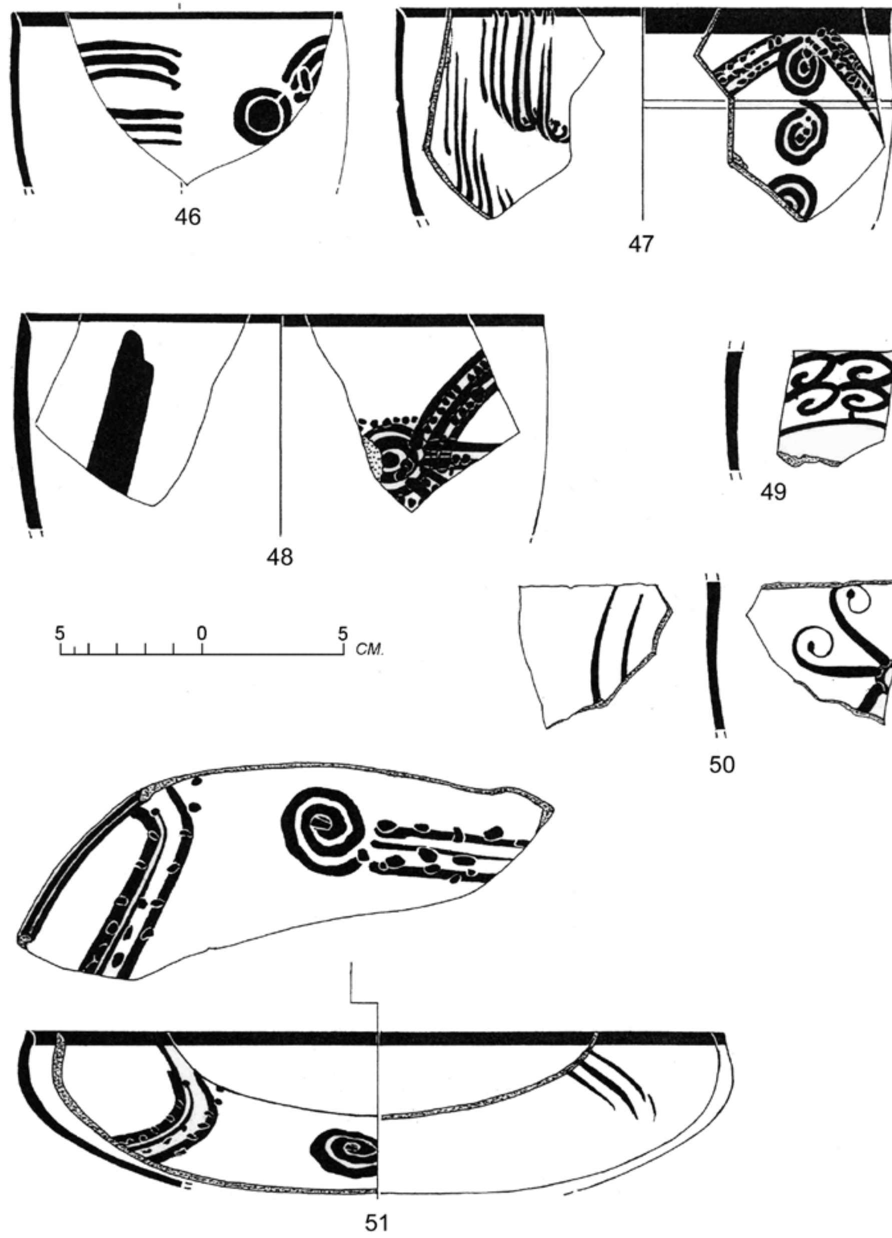


Fig.17. Painted Grey Ware (Pd II)

Fig. 18

52. Bowl with featureless rim, and convex sides showing the profile relived by grooves is of medium fabric and surface treated with dark grey wash. Painted in black on the exterior, designs comprise horizontal bands on the lip followed by spiral alternating with the columns of lines marked by the impressions of two fingers. From a pit of Period II.

53. Mid fragment of steep sided bowl having the profile relieved by grooves and carinated to base is of medium fabric and surface treated with wash contains mica particles. Painted in black on the exterior the design is represented by diagonal cross. From a middle level of Period II.

54. Miniature bowl with the out-curved rim, and concave profile carinated to base is of medium fabric and surface treated with wash contains mica particles. Painted in black the designs comprise an irregular cross on the exterior, and an arc emanates from lip on the interior. From a pit of Period II.

55. Lid having knob handle, featureless rim and grooved profile is of fine fabric and surface treated with blackish wash contains fine particles of mica. Painted in black on outer surface the design comprises sigma. From a pit of Period II.

56. Bowl with an everted rim and steep sides is of fine fabric and outer surface treated with blackish wash contains mica particles. The designs are painted in whitish pigment on the exterior, a column of sigmas, and painted in black, a horizontal band showing overflow of pigment on the inner side of lip. From a pit of Period II.

57. Base fragment probably of dish is of medium fabric and surface treated with wash contains mica particles. Painted in black on the interior the designs comprise a band of sigmas. From a late level of Period II.

58. Dish with an everted rim and convex sides is of fine fabric and surface treated with wash contains mica particles. Painted in black the design comprise horizontal bands on the either sides of lip, emanates a column of chevrons followed by dots and strokes on the interior, and a group of oblique strokes on the outer surface. From a middle level of Period II.

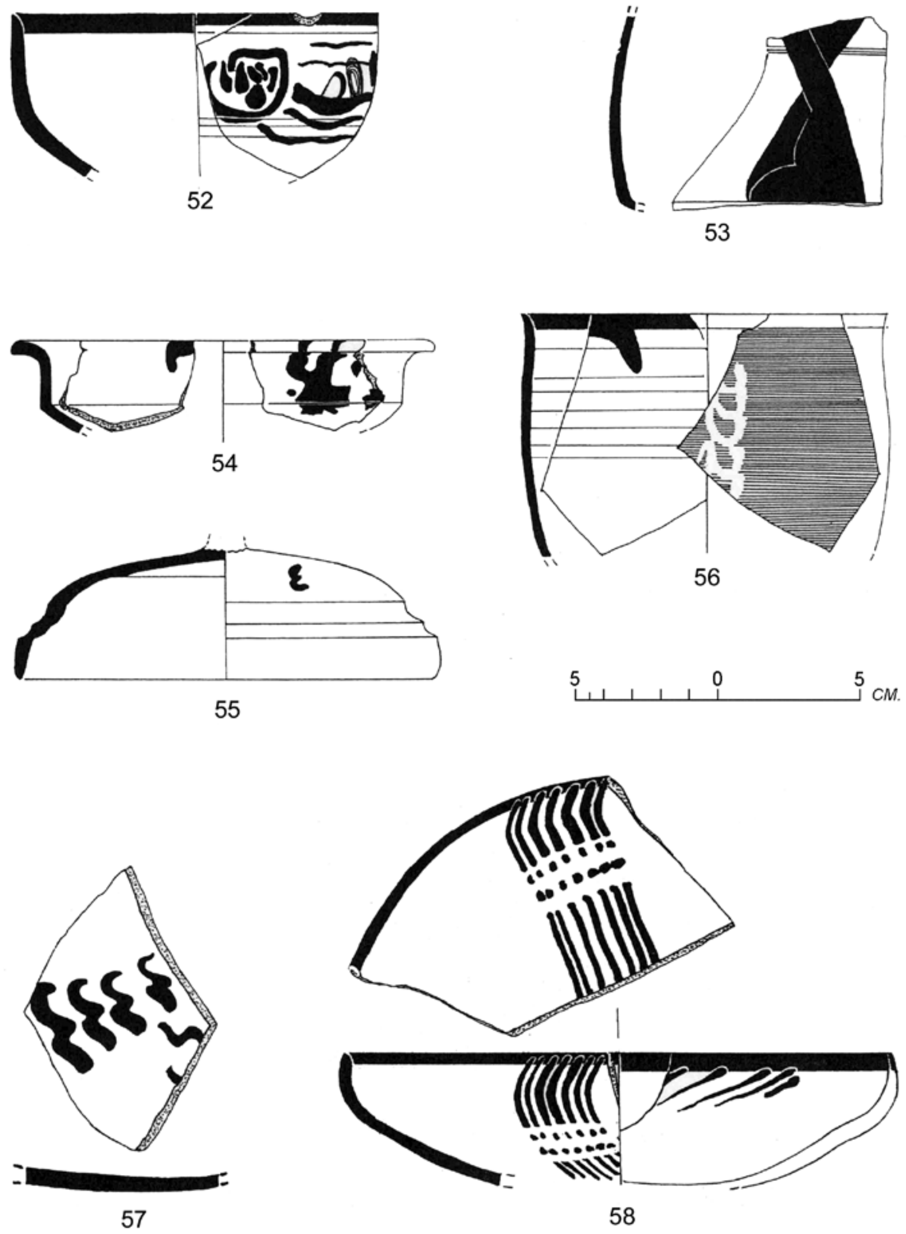


Fig.18. Painted Grey Ware (Pd II)

Associated wares

Fig. 19

1. Bowl of grey ware with an externally beaked rim and convex sides. Of medium fabric, greyish core, it is devoid of any surface treatment.

2. Bowl of red ware with slightly externally beaked rim and convex sides. Of medium fabric, greyish core, it is devoid of any surface treatment.

3. Bowl of grey ware with an externally beaked rim with a less pronounced groove on the top and convex sides. Of medium fabric, greyish core, it is devoid of any surface treatment.

4. Bowl of grey ware with an externally beaked rim and convex sides. Of medium fabric, greyish core, it is treated with black slip on the exterior and top of the rim.

5. Bowl of red ware with an externally beaked rim having three less pronounced grooves on the top and convex sides. Of medium fabric and reddish core, it is devoid of any surface treatment.

6. Bowl of red ware with an externally beaked, undercut rim and convex sides of medium fabric, greyish core, it is treated with wash on the exterior.

7. Bowl of red ware with an externally cordoned rim and convex sides. Of medium fabric, greyish core, it is devoid of any surface treatment.

8. Bowl of red ware with beaked, undercut rim having a prominent rib on the top. Of medium fabric, it is treated with wash both externally and internally.

9. Dish of red ware with a nail-headed rim and convex sides. Of coarse fabric, showing mica in the paste, it is devoid of any surface treatment.

10. Bowl of grey ware with a vertical featureless rim, carinated on the outside at the junction with shoulder. Of fine fabric, greyish core, it is treated with wash both externally and internally.

11. Bowl of dull-red ware with an incurved thinned rim and convex sides. Of medium fabric, slightly greyish core, it is devoid of any surface treatment.

12. Bowl of grey ware with a vertical thinned rim, convex sides and sagger base. Of medium fabric, greyish core, it is devoid of any surface treatment.

13. Bowl of grey ware with a vertical sharpened rim and convex sides. Of fine fabric, greyish core, it is treated with wash on exterior.

14. Bowl of red ware with less pronounced ribs on the body and thread cut footed base. Of coarse fabric, showing mica in the paste, it is devoid of any surface treatment.

15. Miniature vase with an out-turned rim, concave neck and expanding sides. Of medium fabric, it is devoid of any surface treatment.

16. Hand-made miniature vase of dull-grey ware with a featurless rim, convex body and sagger base, of medium fabric, it is devoid of any surface treatment.

17. Dish of grey ware with a vertical featureless rim having a less pronounced groove on the exterior of the rim and convex sides. Of fine fabric, grey core, it is devoid of any surface treatment.

18. Dish of grey ware with a vertical thinned rim, convex sides and carinated at the junction with sagger base. Of fine fabric, grey core, it is devoid of any surface treatment.

19. Dish of grey ware with an incurved thinned rim and convex sides. Of medium fabric, grey core, it is devoid of any surface treatment.

20. Dish of grey ware with an incurved thinned rim having a less pronounced groove on the exterior or rim and convex sides. Of medium fabric, grey core, it is devoid of any surface treatment.

21. Dish of grey ware with vertical thinned rim and almost straight sides. Of fine fabric, grey core, it is devoid of any surface treatment.

22. Dish of grey ware with internally sharpened rim and convex sides having two less pronounced grooves on the exterior of rim. Of fine fabric, grey core, it is devoid of any surface treatment.

23. Dish of grey ware with an incurved thin rim, convex sides and sagger base. Of medium fabric, grey core, it is treated with black pigment on the inner side.

24. Vase of red ware with a vertical sharpened rim having a prominent rib on cordon on the exterior of rim. Of coarse fabric, it is devoid of any surface treatment.

25. Vase of red ware with a vertical featureless rim marked by a cordon on the exterior at the junction with lower part. Of gritty coarse fabric, it is devoid of any surface treatment.

26. Vase of red ware with a vertical thickened rim, marked by a cordon on the exterior at the junction with lower part. Of gritty coarse fabric, greyish core, it is devoid of any surface treatment.

27. Vase of red ware with a vertical sharpened, thickened, externally ribbed rim. Of gritty coarse fabric, it is devoid of any surface treatment.

28. Vase of red coarse ware with a vertical featureless rim, marked by a cordon on the exterior at the junction with lower part. Of coarse fabric, grey core, it is devoid of any surface treatment.

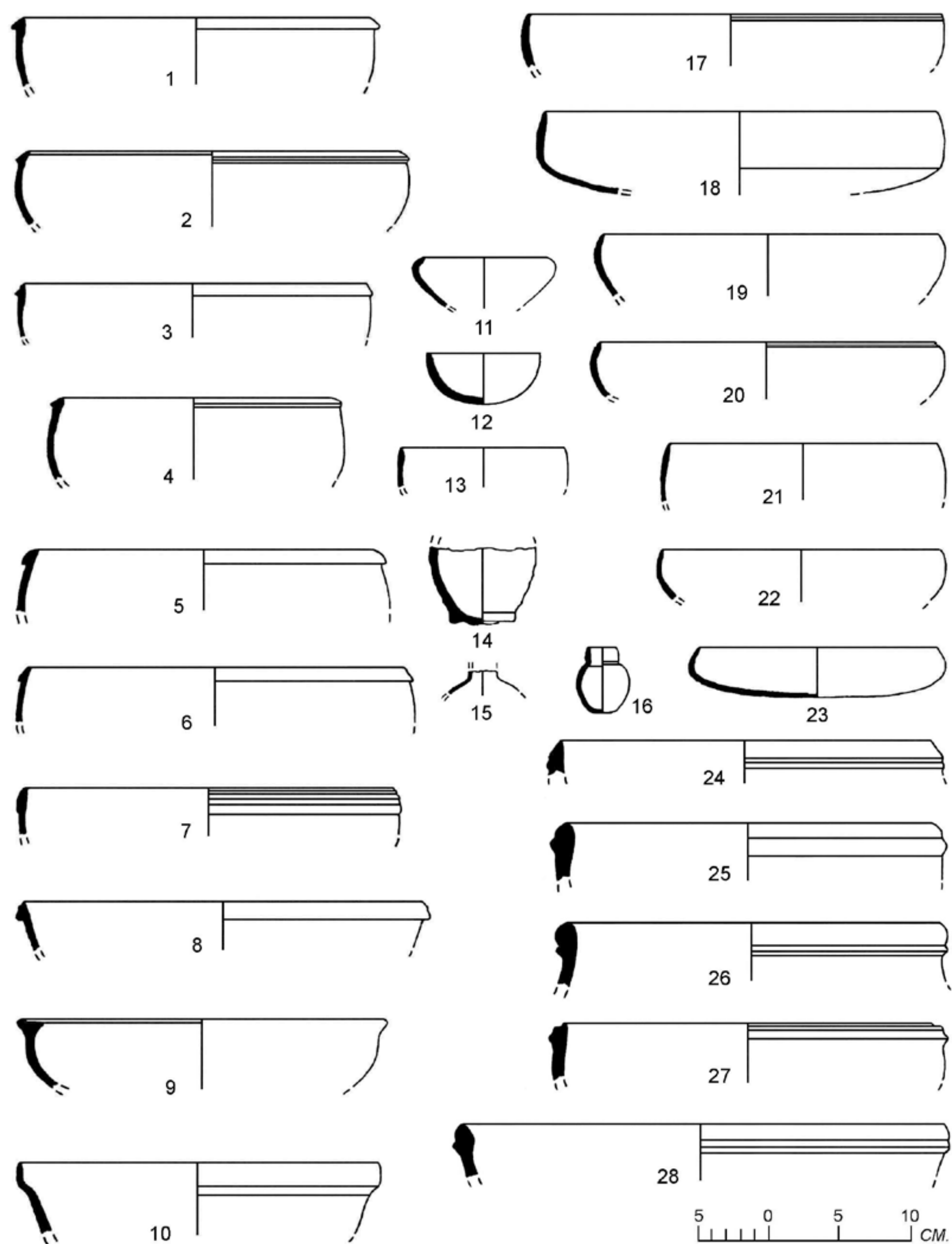


Fig.19. Associated ware (Pd II)

Fig. 20

1. Vase of dull-red ware with a vertical thickened rim and concave neck. Of gritty coarse fabric, greyish core, showing mica in the paste, it is devoid of any surface treatment.

2. Vase of dull-red ware with a vertical thickened rim having a less pronounced rib on the exterior. Of gritty coarse fabric, greyish core, showing mica in the paste, it is devoid of any surface treatment.

3. Vase of dull-red ware with a vertical thickened rim having a less pronounced rib on the exterior. Of gritty coarse fabric, greyish core, showing mica in the paste, it is devoid of any surface treatment.

4. Vase of red ware with an externally bevelled rim and concave neck. Of gritty coarse fabric, greyish core, showing mica in the paste, it is devoid of any surface treatment.

5. Vase of pale-red ware with a vertical thickened, externally bevelled rim and concave neck. Of gritty coarse fabric, slightly greyish core, it is devoid of any surface treatment.

6. Vase of pale-red ware with a dubbed rim and concave neck. Of gritty coarse fabric, greyish core, showing mica in the paste, it is devoid of any surface treatment.

7. Vase of red ware with externally beaked rim and concave neck. Of gritty coarse fabric, greyish core, showing mica in the paste, it is devoid of any surface treatment.

8. Vase of pale-red ware with a vertical thickened, externally bevelled rim and concave neck. Of gritty coarse fabric, it is devoid of any surface treatment.

9. Vase of red ware with an out-turned thickened rim and concave neck. Of fine fabric, it is treated both externally and internally with red slip.

10. Vase of red ware with an externally cordoned rim. Of medium fabric, it is treated both externally and internally with wash.

11. Vase of pale-red war with an externally bevelled rim having a sharp carination on the inner side of neck. Of gritty coarse fabric, slightly greyish core, showing mica in the paste, it is devoid of any surface treatment.

12. Ring base of a pot. Of gritty coarse fabric, blackish core, showing mica in the paste, it is devoid of any surface treatment.

13. Miniature vase of dull-red ware with an out-turned thickened rim. Of fine fabric, showing mica in the paste, it is treated both externally and internally with wash.

14. Miniature vase of pale-red ware with angularly out-turned rim and expanding sides. Of fine fabric, it is treated both externally and internally with wash.

15. Miniature vase of dull-red ware with a vertical thickened rim having a groove on the top and concave neck. Of fine fabric, it is treated both externally and internally with wash.

16. Lid-cum-bowl of pale-red ware with a short oblique lip externally re-curved for a horizontal flange. Of medium fabric, it is devoid of any surface treatment.

17. Lid-cum-bowl of dull-red ware with an oblique lip externally re-curved for a horizontal flange. Of gritty coarse fabric, showing mica in the paste, it is devoid of any surface treatment.

18. Lid-cum-bowl of dull-red ware with an oblique lip externally re-curved and having a flat base. Of gritty coarse fabric, showing mica in the paste, it is devoid of any surface treatment.

19. Lid-cum-bowl of red ware with an oblique lip externally recurved and having a flat string-cut base. Of fine fabric, showing mica in the paste, it is treated both externally and internally with red slip.

20. Vase of dull-red ware with an externally beaked rim and concave neck. Of coarse fabric, showing mica in the paste, it is devoid of any surface treatment.

21. Vase of dull-red ware with an out-turned slightly beaked rim and concave neck. Of gritty coarse fabric, blackish core, it is devoid of any surface treatment.

22. Vase of red ware with an out-turned thickened rim and concave neck. Of medium fabric, it is treated both externally and internally with wash.

23. Vase of coarse grey ware with an externally beaked rim and almost straight neck. Of coarse fabric, greyish core, it is devoid of any surface treatment.

24. Vase of pale-red ware with a vertical thickened rim and almost straight neck. Of gritty coarse fabric, blackish core, it is devoid of any surface treatment.

25. Vase of red ware with a vertical thickened rim and concave neck. Of medium fabric, showing mica in the paste, it is devoid of any surface treatment.

26. Vase of red ware with a vertical featureless rim and concave neck. Of coarse fabric, it is devoid of any surface treatment.

27. Vase of dull-red ware with an out-turned thickened rim and expanding sides. Of coarse fabric, showing mica in the paste, it is treated on the out-side with wash and having incised oblique lines on the belly.

28. Vase of pale-red ware with a vertical thickened rim, concave neck and expanding sides. Of gritty coarse fabric, slightly greyish core, showing mica in the paste, it is devoid of any surface treatment.

29. Vase of dull-red ware with a triangular collared rim and expanding sides. Of medium fabric, showing mica in the paste, it is devoid of any surface treatment.

30. Vase of pale-red ware with an out-turned thinned rim and convex profile. Of medium fabric, greyish core, showing mica in the paste, it is devoid of any surface treatment and having two grooves one each at the shoulder and belly.

31. Vase of dull-red ware with an externally cordoned rim and concave neck. Of gritty coarse fabric, slightly greyish core, showing mica in the paste, it is devoid of any surface treatment.

32. Vase of red ware with an externally collared rim and expanding sides. Of medium fabric, showing mica in the paste, it is devoid of any surface treatment.

33. Vase of drab-red ware with an externally cordoned rim and concave neck. Of medium fabric, greyish core, it is devoid of any surface treatment and having a row of incised triangular dots on the shoulder.

34. Vase of pale-red ware with an externally beaded and undercut rim. Of gritty coarse fabric, greyish core, it is devoid of any surface treatment.

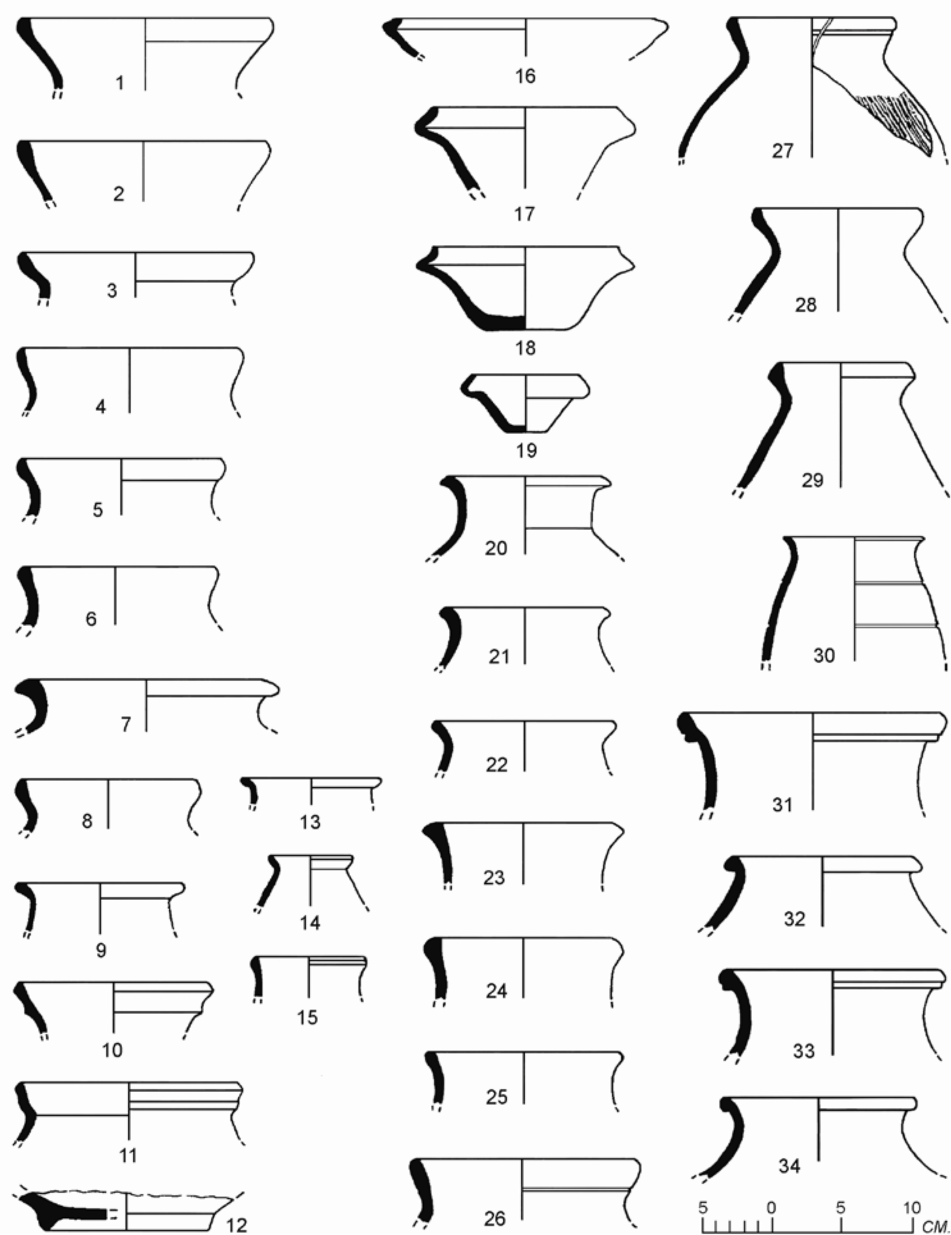
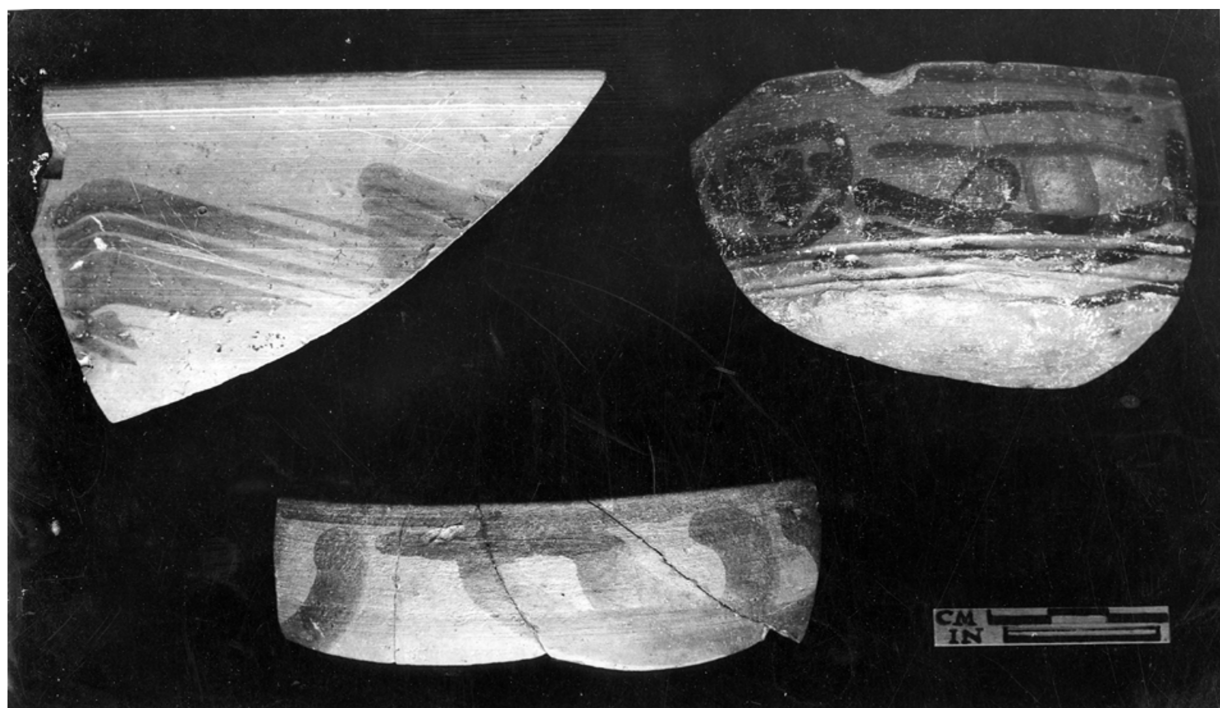


Fig.20. Associated ware (Pd II)

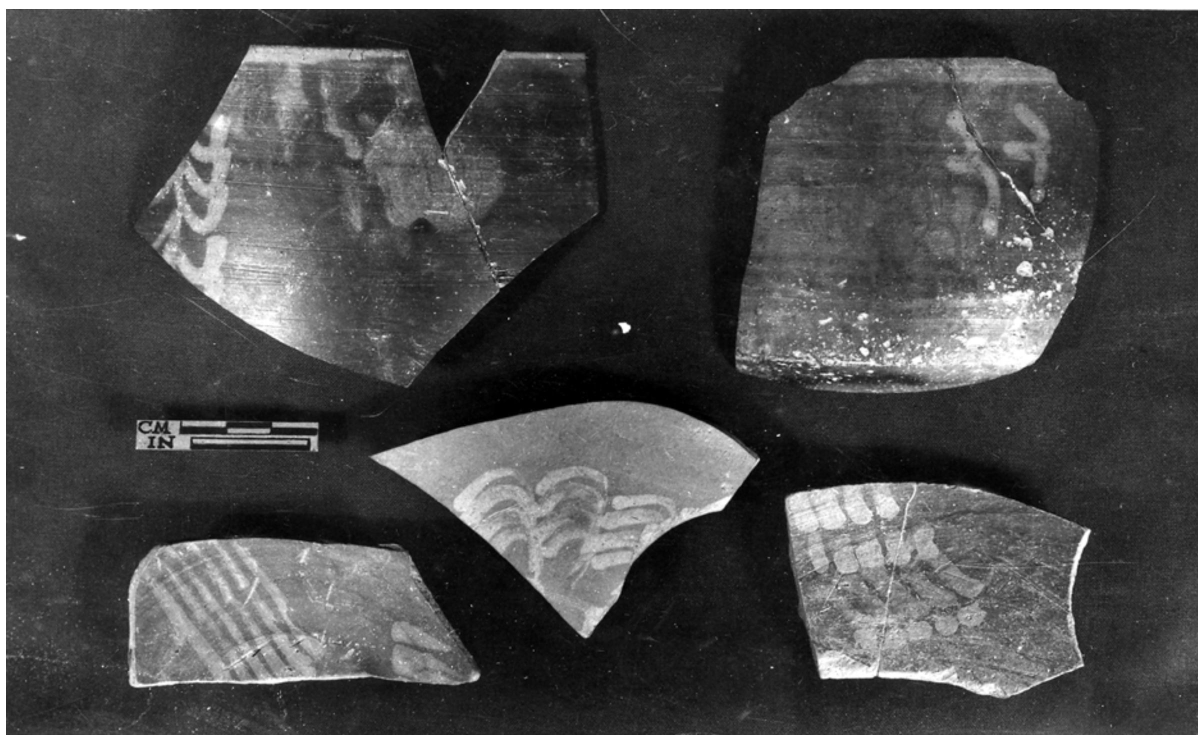
Plates



Pl. XI. Motifs on Painted Grey Ware



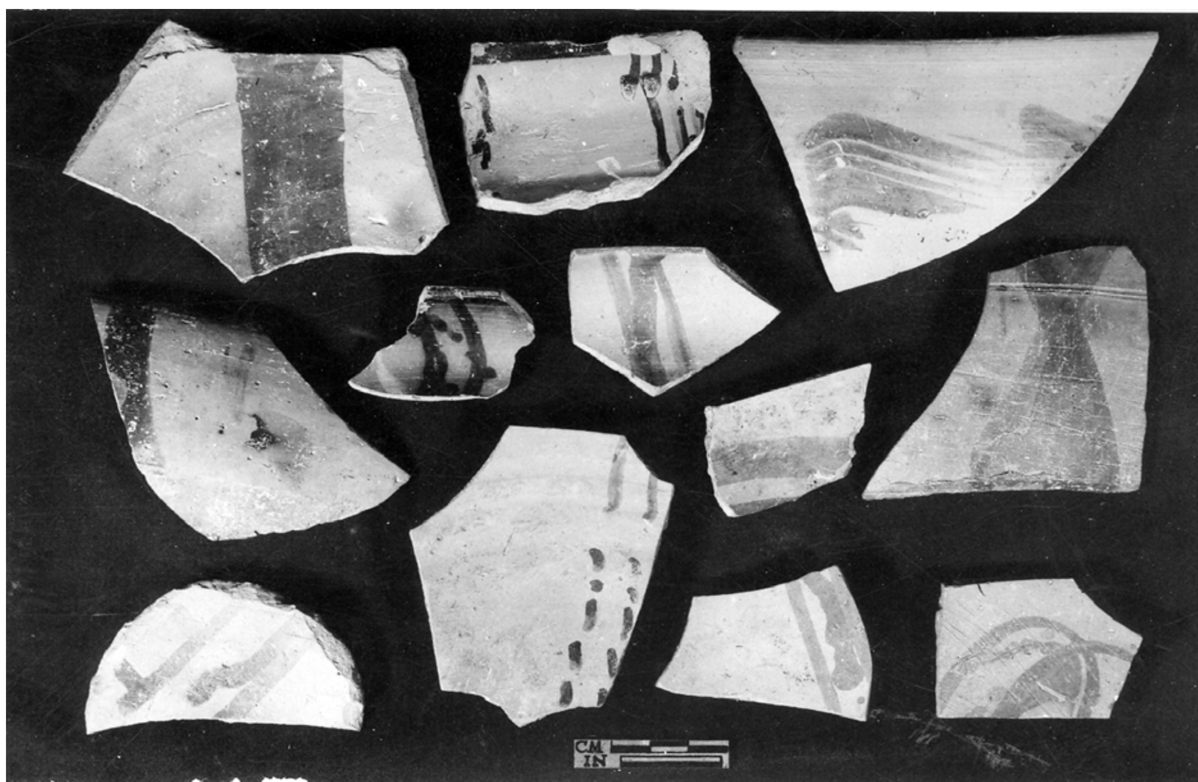
Pl. XII. Motifs on Painted Grey Ware



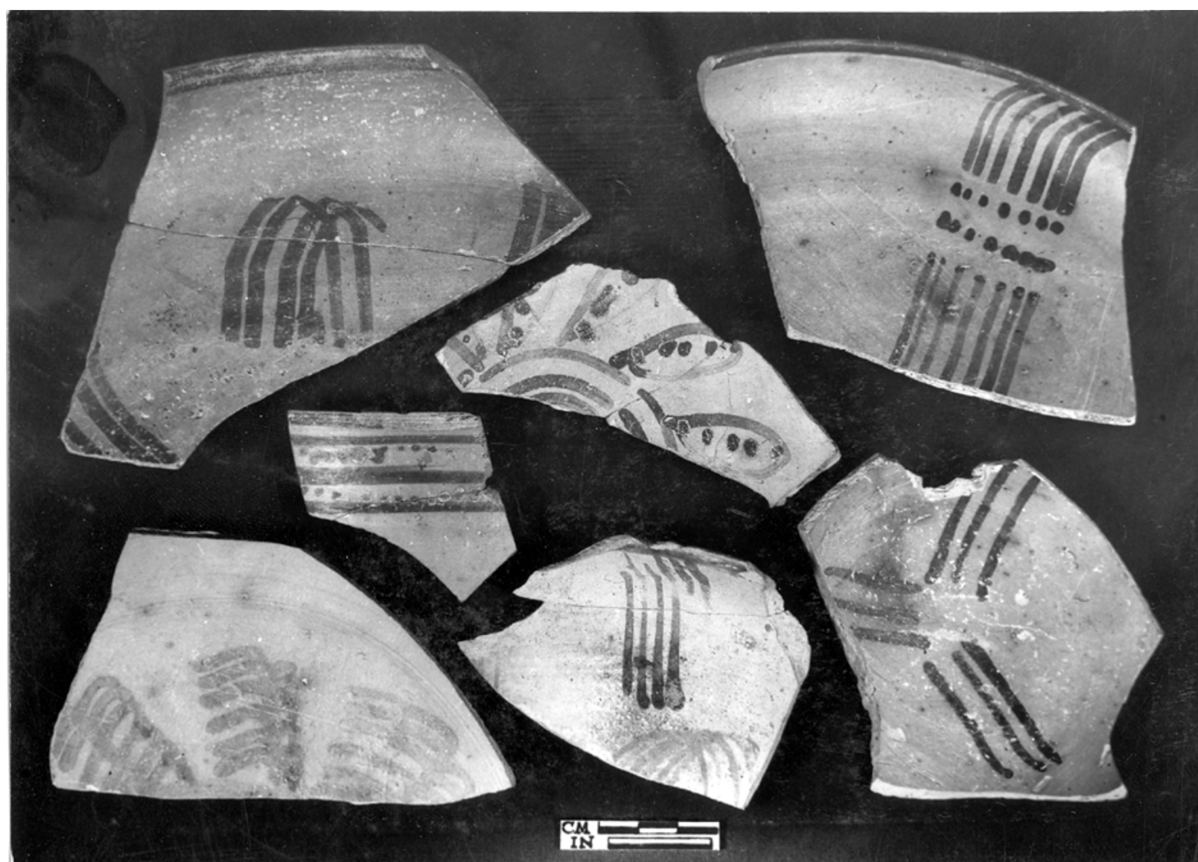
Pl. XIII. Motifs on Painted Grey Ware



Pl. XIV. Motifs on Painted Grey Ware



Pl. XV. Motifs on Painted Grey Ware



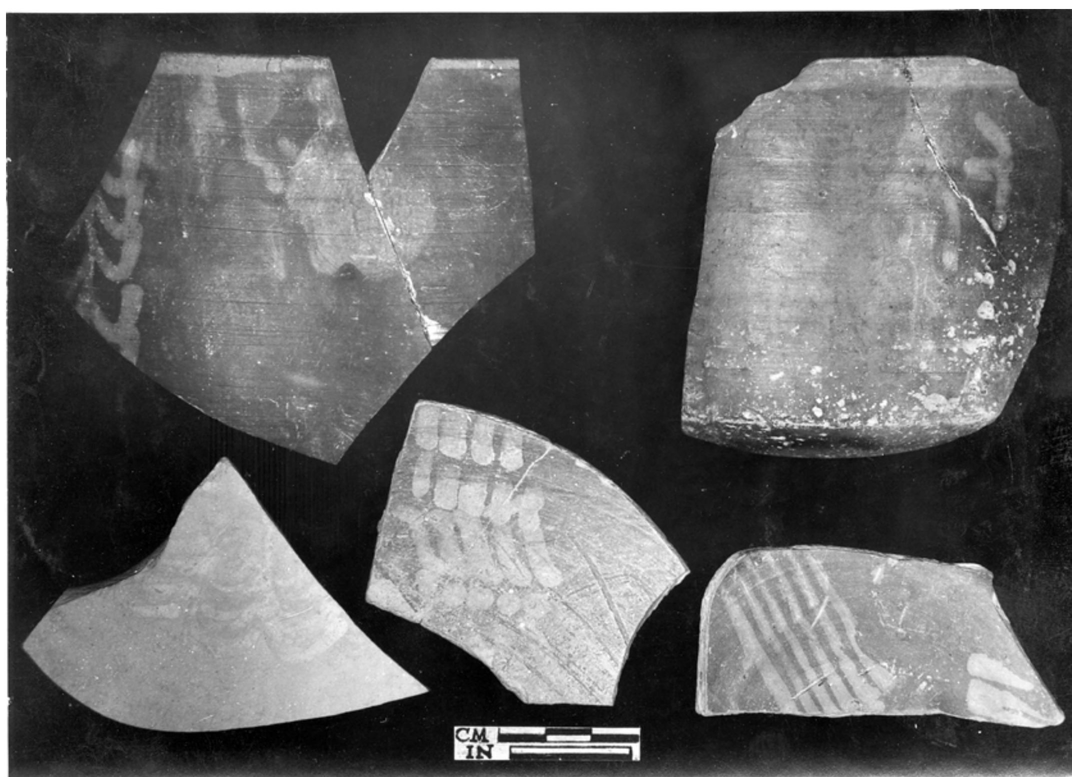
Pl. XVI. Motifs on Painted Grey Ware



Pl. XVII. Motifs on Painted Grey Ware



Pl. XVIII. Motifs on Painted Grey Ware



Pl. XIX. Motifs on Painted Grey Ware

PERIOD III

The main ceramic of this period falls into two categories viz. (i) Red ware and (ii) Pale-red ware. The only exception being the occurrence of few sherds of black-slipped, grey ware, dull grey ware, Painted Grey Ware and dull red ware. The pottery of this period is entirely wheel made having gritty coarse to fine fabric. Mica is also used as tempering material. The larger percentage however is treated with wash and slip, except few potsherds which are devoid of any slip on wash. The wares are generally unpainted though painted sherds are not altogether absent. Few sherds of grey ware are painted in black pigment with vertical strokes and dots on the exterior, and a vase of red ware having painting on both exterior and interior, in black pigment with thick horizontal bands covering rim and neck.

The extensive group of pottery as a result of mass production during this period show a wide range of shapes with many variants. Important shapes are jar having externally ribbed rim, sharpened rim, beaked rim, collared rim, splayed out rim and cordoned rim, vases with externally ribbed rim, collared rim, sharpened rim, beaked rim, basins having inturned thinned rim, nail headed rim, bowls of vertical featureless rim, bowl-cum-lids and dishes were encountered. Mention may be made about a high double storage jar **(Pl. XX)**.

Fig. 21

1. Fragment of a jar of dull-red ware with a thickened rim. Of coarse fabric, showing mica in the paste, it is devoid of any surface treatment.

2. Fragment of a vase of red ware with a vertical, externally ribbed rim and concave neck; of medium fabric, greyish core, showing mica in the paste, it is treated both externally and internally with red slip.

3. Fragment of a jar of red ware with an externally cordoned rim and concave neck. Of medium fabric, showing mica in the paste, it is treated with red slip.

4. Fragment of a jar of red ware with a vertical sharpened rim and slightly carinated below the rim. Of fine fabric, showing mica in the paste, it is treated with red wash.

5. Fragment of a jar of dull-red ware with a flat-headed, externally beaked rim and concave neck. Of gritty coarse fabric, showing mica in the paste, it is devoid of any surface treatment.

6. Fragment of a jar of red ware with an externally collared rim. Of coarse fabric, greyish core, showing mica in the paste, it is treated with red wash.

7. Fragment of a vase of red ware with a splayed out cordoned rim. Of fine fabric, showing mica in the paste, it is treated with red slip and painted both externally and internally in black pigment with thick horizontal bands covering rim and neck.

8. Fragment of a vase of red ware with a vertical sharpened externally collared rim and concave neck. Of medium fabric, showing mica in the paste, it is treated with red slip on the outside and upto the neck inside.

9. Fragment of a vase of pale-red ware with an externally collared rim and concave neck. Of medium fabric, showing mica in the paste, it is devoid of any slip.

10. Fragment of a vase of grey ware with a flat-headed, externally ribbed rim. Of fine fabric, it is treated externally with black slip.

11. Fragment of a jar of red ware with a featureless rim and concave neck. Of gritty coarse fabric, showing mica in the paste, it is devoid of any slip or wash.

12. Fragment of a jar of red ware with a vertical thinned rim and concave neck. Of coarse fabric, showing mica in the paste, it is grey from inside due to inverted firing.

13. Fragment of a vase of red ware with an externally collared rim and concave neck. Of medium fabric, showing mica in the paste, it is treated with red wash.

14. Fragment of a vase of red ware with a flat-headed, externally ribbed rim and concave neck. Of medium fabric, showing mica in the paste, it is devoid of any slip.

15. Fragment of a vase of red ware with a vertical sharpened, externally collared rim and concave neck. Of medium fabric, showing mica in the paste, it is treated with red wash.

16. Fragment of a jar of red ware with a splayed out, thickened rim and concave neck. Of medium fabric, greyish core, showing mica in the paste, it is treated externally with red wash.

17. Fragment of a vase of pale-red with an externally collared rim and concave neck. The body is corrugated from inside. Of medium fabric, showing mica in the paste, it is devoid of any slip or wash.

18. Fragment of a vase of pale-red ware with a vertical, externally ribbed rim and concave neck. Of medium fabric, greyish core, showing mica in the paste, it is treated both externally and internally with pale-red wash.

19. Fragment of a jar of pale-red ware with a vertical sharpened externally collared rim and concave neck. Of medium fabric, greyish core, showing mica in the paste, it is devoid of any slip or wash.

20. Fragment of a vase of red ware with a flat-headed, externally ribbed rim. Of medium fabric, bright reddish core, it is treated with red wash.

21. Fragment of a jar of red ware with a vertical thickened rim and concave neck. Of medium fabric, showing mica in the paste, it is treated with red wash.

22. Fragment of a vase of grey ware with an externally beaked rim. Of medium fabric, grey core, it is devoid of any slip or wash.

23. Fragment of a vase of red ware with an externally collared rim and concave neck. Of fine fabric, greyish core, showing mica in the paste, it is treated with pale-red wash.

24. Fragment of a vase of pale-red ware with an externally grooved rim and concave neck. Of coarse fabric, greyish core, showing mica in the paste, it is treated with pale-red wash.

25. Fragment of a vase of pale-red ware with a vertical sharpened externally collared rim and concave neck. Of medium fabric, showing mica in the paste, it is treated with pale-red wash.

26. Fragment of a vase of red ware with an out-turned, featureless rim and concave neck. Of medium fabric, showing mica in the paste, it is treated with red wash.

27. Fragment of a vase of pale-red ware with an externally collared rim and concave neck. Of medium fabric, showing mica in the paste, it is devoid of any slip or wash.

28. Fragment of a vase of pale-red ware with an externally cordoned rim. Of medium fabric, showing mica in the paste, it is devoid of any slip or wash.

29. Fragment of a jar of red ware with an externally collared rim and concave neck. Of medium fabric, showing mica in the paste, it is treated with red wash on the outside and upto the back inside.

30. Fragment of a jar of red ware with an externally cordoned rim and concave neck. Of medium fabric, showing mica in the paste, it is treated with red wash.

31. Fragment of a vase of pale-red ware with an out-turned, externally grooved rim. Of medium fabric, greyish core, showing mica in the paste, it is treated with red slip on the exterior.

32. Fragment of a jar of pale-red ware with a vertical sharpened, externally collared rim, wavy from inside and concave neck. Of medium fabric, greyish core, showing mica in the paste, it is grey from inside due to inverted firing.

33. Fragment of a jar of red ware with a flat-headed, externally ribbed rim. Of coarse fabric, greyish core, showing mica in the paste, it is treated with red wash.

34. Fragment of a jar of pale-red ware with an externally collared rim and concave neck. Of medium fabric, greyish core, showing mica in the paste, it is devoid of any slip or wash.

35. Fragment of a vase of red ware with an out-turned featureless rim and concave neck. Two grooves are visible on the shoulder. Of fine fabric, showing mica in the paste, it is treated with red wash.

36. Fragment of a vase of red ware with an externally cordoned rim. Of fine fabric, it is treated both externally and internally with red slip.

37. Fragment of a vase of pale-red ware with an externally cordoned rim. Of medium fabric, greyish core, showing mica in the paste, it is treated with pale-red wash.

38. Fragment of a vase of grey ware with an out-turned featureless rim. Of fine fabric, grey core, it is treated with grey wash.

39. Fragment of a vase of red ware with a featureless, externally collared rim. Of medium fabric, showing mica in the paste, it is treated with red wash.

40. Fragment of a jar of pale-red ware with an out-turned thinned rim and concave neck. Of medium fabric, reddish core, showing mica in the paste, it is devoid of any slip or wash.

41. Fragment of a jar of pale-red ware with a vertical featureless rim, wavy body and concave neck. Of gritty coarse fabric, showing mica in the paste, it is devoid of any slip or wash.

42. Fragment of a vase of pale-red ware with a vertical sharpened, externally collared rim and concave neck. Of gritty coarse fabric, greyish core, it is black from inside due to inverted firing.

43. Fragment of a jar of pale-red ware with vertical sharpened, externally collared rim and concave neck. Of gritty coarse fabric, showing mica in the paste, it is devoid of any slip or wash.

44. Fragment of a vase of a pale-red ware with a vertical thinned, externally collared rim. Of medium fabric, greyish core, showing mica in the paste, it is devoid of any slip or wash.

45. Flat base of bowl of grey ware with tapering sides. The base is characterised by a circular ridge and a small core in the centre. Of fine fabric, greyish core, it is treated both externally and internally with dark grey slip.

46. Fragment of a jar of dull-grey ware with a vertical thinned, externally collard rim and concave neck. Of coarse fabric, showing mica in the paste, it is treated externally with grey wash.

47. Fragment of a jar of red ware with prominent nail-headed rim and concave neck. Of medium fabric, greyish core, it is treated both externally and internally with red wash.

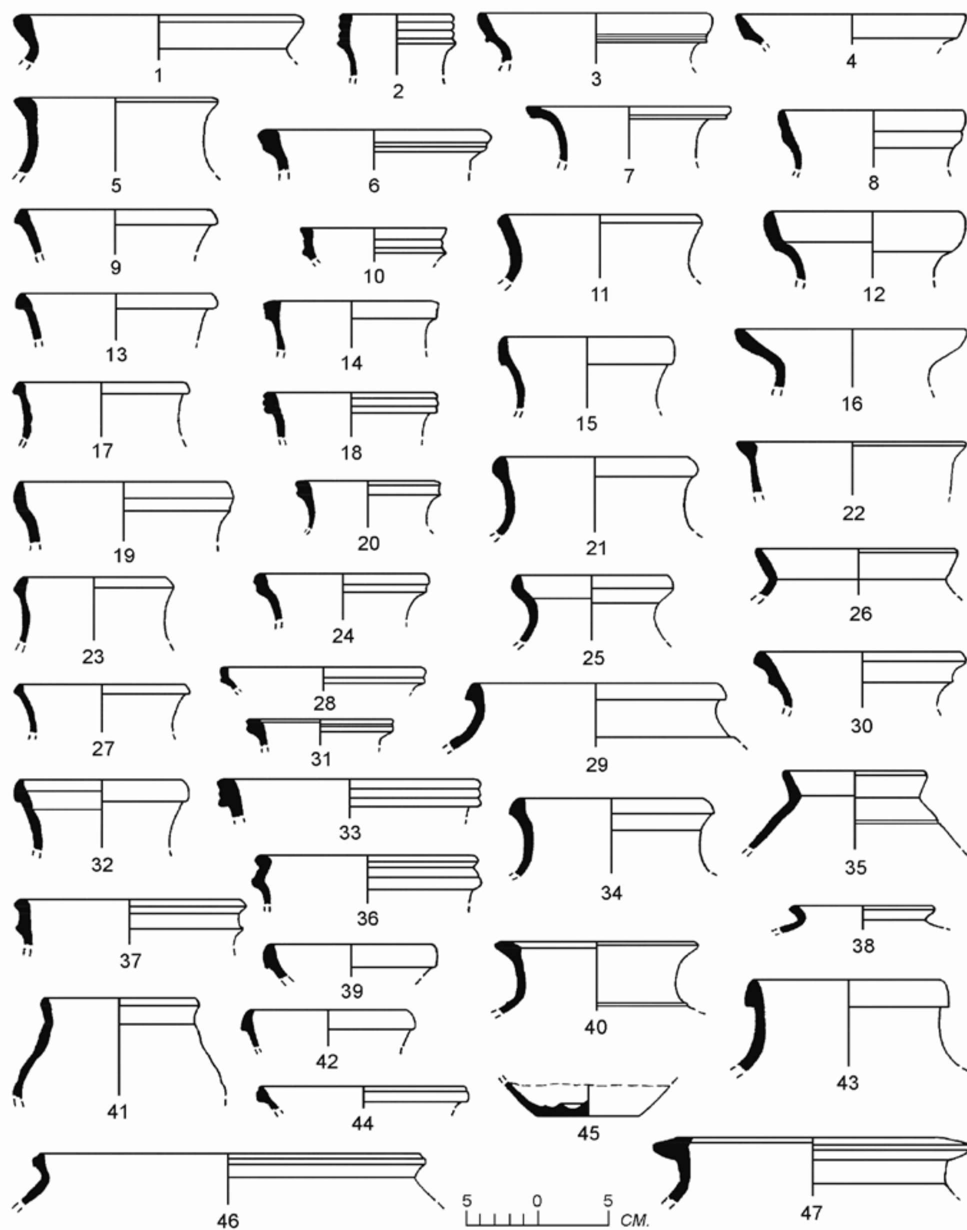


Fig.21. Northern Black Polished Ware (Pd III)

Fig. 22

1. Fragment of a vase of a pale-red ware with a flat-headed, externally beaked rim. Of medium fabric, greyish core, showing mica in the paste, it is devoid of any slip or wash.

2. Fragment of a vase of a pale-red ware with an externally beaked rim, concave neck and slightly wavy neck from inside. Of medium fabric, showing mica in the paste, it is treated both externally and internally with pale-red wash.

3. Fragment of a vase of red ware with an externally beaked rim and concave neck. Of medium fabric, showing mica in the paste, it is treated both externally and internally with grey wash.

4. Fragment of a vase of red ware with an externally beaked rim and concave neck. One groove each on rim and inner side of neck is also visible. Of medium fabric, showing mica in the paste, it is treated both externally and internally with red wash.

5. Fragment of a vase of grey ware with an externally beaded rim and concave neck. Of medium fabric, grey core, showing mica in the paste, it is treated both externally and internally with grey wash.

6. Fragment of a vase of pale-red ware with an out-turned, thinned rim and concave neck. Of medium fabric, showing mica in the paste, it is devoid of any slip or wash.

7. Fragment of a vase of a pale-red ware with an externally beaked rim, concave neck. Of medium fabric, showing mica in the paste, it is treated both externally and internally with pale-red wash.

8. Fragment of a vase of a pale-red ware with a flat headed, externally beaked rim and concave neck. Of medium fabric, showing mica in the paste, it is treated with pale-red wash.

9. Fragment of a vase of red ware with an externally beaded rim and concave neck. Of medium fabric, greyish core, showing mica in the paste, it is treated both externally and internally with red wash.

10. Fragment of a jar of red ware with an externally thickened rim and concave neck. Of medium fabric, showing mica in the paste, it is devoid of any slip or wash.

11. Fragment of a vase of dull-red ware with a prominent nail-headed rim and concave neck. Of medium fabric, showing mica in the paste, it is treated both externally and internally with dull-red wash.

12. Fragment of a vase of red ware with an externally collared rim and concave neck. Of medium fabric, showing mica in the paste, it is treated both externally and internally with red wash.

13. Fragment of a bowl of grey ware with a vertical sharpened, externally collared rim and convex sides. Of fine fabric, grey core, it is treated both externally and internally with grey wash.

14. Fragment of a bowl of grey ware with a vertical internally bevelled rim and convex sides. Of medium fabric, grey core, it is treated externally with black wash.

15. Fragment of a bowl of grey ware with a vertical thinned rim, almost straight side and carinated at the junction with convex base.

16. Fragment of a bowl of pale-grey ware with a vertical sharpened rim and incurved sides. Of fine fabric, it is treated with pale grey wash.

17. Fragment of a bowl of pale red ware with a vertical sharpened rim and tapering sides. Of medium fabric, showing mica in the paste, it is treated internally with pale-red wash.

18. Fragment of a bowl of grey ware with a vertical sharpened rim and convex sides. Of fine fabric, grey core, it is devoid of any slip or wash.

19. Fragment of a bowl of pale-red ware with a vertical internally sharpened rim and tapering sides. Of fine fabric, showing mica in the paste, it is treated both externally and internally with pale-red wash.

20. Fragment of a bowl of pale-red ware with an incurved sharpened rim and curved sides. Of medium fabric, showing mica in the paste, it is treated both externally and internally with pale-red wash.

21. Fragment of a bowl of pale-red ware with an inturned thinned rim and tapering sides. Of fine fabric, showing mica in the paste, it is treated both externally and internally with pale-red wash.

22. Fragment of a bowl of pale-red ware with an inturned externally bevelled rim, tapering sides and body slightly wavy. Of medium fabric, showing mica in the paste, it is devoid of any slip or wash.

23. Fragment of a bowl of pale-red ware with an inturned thinned rim and tapering sides. Of fine fabric, showing mica in the paste, it is treated with pale-red wash.

24. Fragment of a vase of pale-red ware with a vertical thinned, externally collared rim and concave neck. Of medium fabric, showing mica in the paste, it is treated both externally and internally with pale-red wash.

25. Fragment of a vase of pale-red ware with a vertical thinned, externally collared rim and concave neck. Of medium fabric, showing mica in the paste, it is treated both externally and internally with pale-red wash.

26. Fragment of a vase of pale-red ware with a vertical featureless externally collared rim and concave neck. Two ribs are also visible on the rim. Of medium fabric, reddish core, showing mica in the paste, it is treated both externally with pale-red wash.

27. Fragment of vase of pale-red ware with a vertical featureless, externally cordoned rim and concave neck. Of medium fabric, showing mica in the paste, it is treated with pale-red wash.

28. Fragment of a vase of red ware with a vertical featureless externally collared rim and concave neck. Of medium fabric, showing mica in the paste, it is devoid of any slip or wash.

29. Fragment of vase of pale-red ware with a vertical featureless, externally collared rim and almost straight sides. Of medium fabric, showing mica in the paste, it is treated both externally and internally with pale-red wash.

30. Fragment of a vase of pale red ware with a vertical featureless externally collared rim and almost straight sides. Of medium fabric, showing mica in the paste, it is devoid of any slip or wash.

31. Fragment of a vase of pale-red ware with an inturned featureless rim and concave neck. Of medium fabric, showing mica in the paste, it is devoid of any slip or wash.

32. Fragment of a vase of pale-red ware with a vertical featureless externally collared rim and concave neck. Of medium fabric, showing mica in the paste, it is treated both externally and internally with pale-red wash.

33. Fragment of a vase of pale-red ware with a vertical featureless externally collared rim, concave neck and corrugated shoulder. Of medium fabric, showing mica in the paste, it is treated both externally and internally with pale-red wash.

34. Fragment of a vase of pale-red ware with a vertical featureless externally collared rim, corrugated shoulder. No well-defined neck is visible and body abruptly starts below the rim. Of medium fabric, showing mica in the paste, it is treated both externally and internally with pale-red wash.

35. Fragment of a vase of pale-red ware with an inturned thinned externally collared rim and concave neck. Of medium fabric, showing mica in the paste, it is treated with pale-red wash.

36. Fragment of a vase of pale-red ware with a vertical featureless externally cordoned rim and almost straight sides. Of medium fabric, showing mica in the paste, it is treated with pale-red wash.

37. Fragment of a vase of pale-red ware with a vertical featureless externally cordoned rim and concave neck. Of medium fabric, showing mica in the paste, it is treated externally and internally with pale-red wash.

38. Fragment of a vase of pale-red ware with a vertical featureless externally cordoned rim and concave neck. Of medium fabric, greyish core, showing mica in the paste, it is treated externally and internally with pale-red wash.

39. Fragment of a vase of pale-red ware with a vertical thinned externally cordoned rim and concave neck. Of medium fabric, reddish core, showing mica in the paste, it is treated externally and internally with pale-red wash.

40. Fragment of a vase of red ware with a vertical featureless externally cordoned rim and concave neck. Of medium fabric, showing mica in the paste, it is treated externally and internally with red wash.

41. Fragment of a vase of pale-red ware with a vertical externally less pronounced cordoned rim and concave neck. Of medium fabric, greyish core, showing mica in the paste, it is devoid of any surface treatment.

42. Fragment of a vase of pale-red ware with a vertical, externally less pronounced cordoned rim and straight sides. Of medium fabric, showing mica in the paste, it is treated with pale-red wash.

43. Fragment of a vase of pale-red ware with a vertical featureless externally less pronounced cordoned rim and almost straight sides. Of medium fabric, showing mica in the paste, it is treated with pale-red wash.

44. Fragment of a vase of pale-red ware with a vertical featureless externally cordoned rim and concave neck. Of medium fabric, showing mica in the paste, it is treated with pale-red wash.

45. Fragment of a vase of pale-red ware with a vertical thickened externally collared rim and concave neck. Of medium fabric, showing mica in the paste, it is treated with pale-red wash.

46. Fragment of a vase of pale-red ware with a vertical thickened externally cordoned rim and concave neck. Of medium fabric, showing mica in the paste, it is treated with pale-red wash.

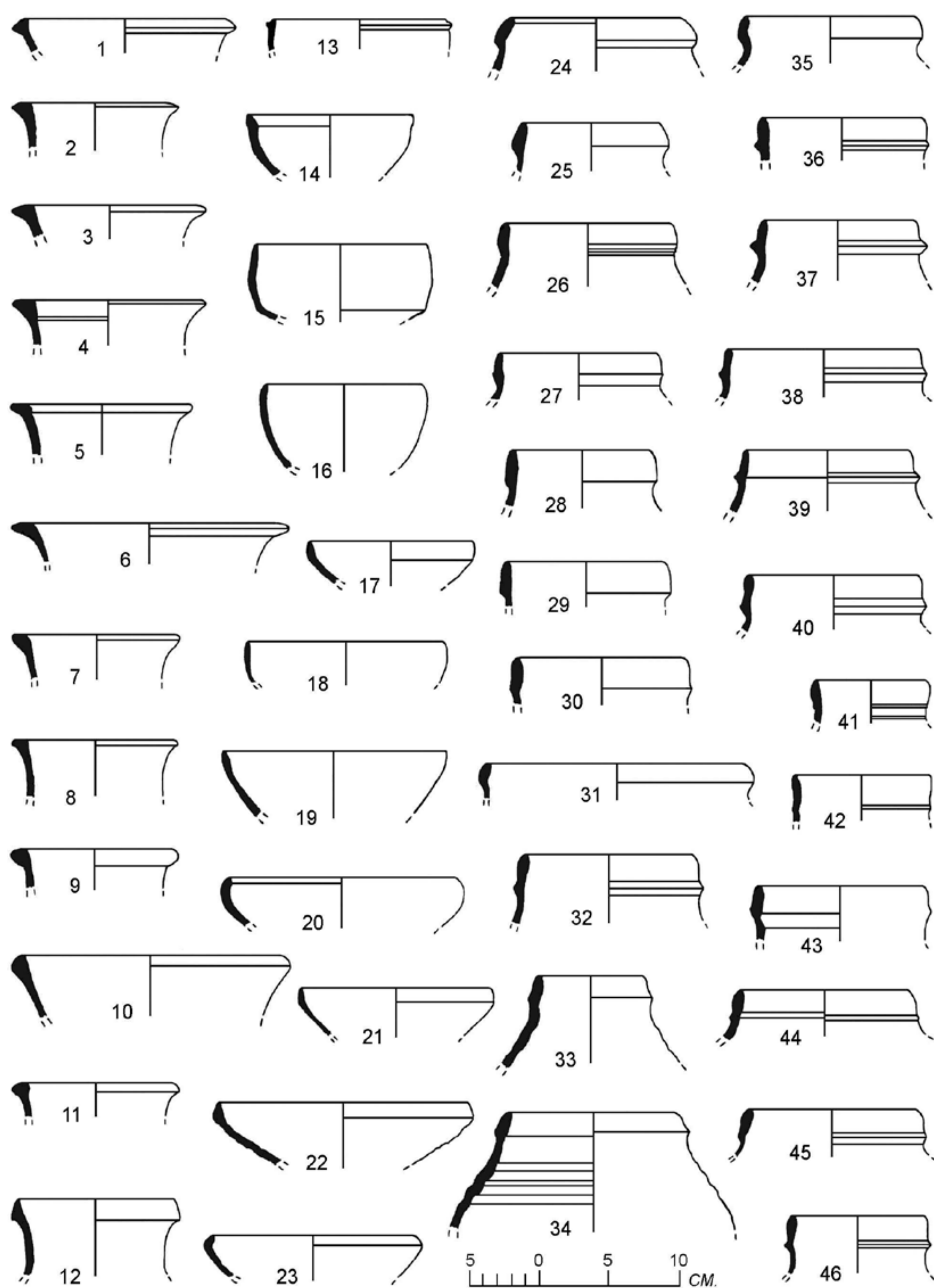


Fig.22. Northern Black polished Ware (Pd III)

Fig. 23

1. Fragment of a basin of pale-red ware with an inturned thinned rim having two ribs on the exterior and tapering sides. Of medium fabric, greyish core, showing mica in the paste, it is treated with pale-red wash.

2. Fragment of a basin of red ware with an inturned thinned rim having a single rib on the exterior, greyish core showing mica in the paste, it is treated with red wash.

3. Fragment of a basin of dull-red ware with an inturned rim having two ribs on the exterior and tapering sides. Of coarse fabric, greyish core, showing mica in the paste, it is treated with red wash.

4. Fragment of a basin of pale-red ware with an inturned thinned externally collared rim and tapering sides. Of coarse fabric, greyish core, showing mica in the paste, it is treated with red wash.

5. Fragment of a bowl of red ware with an inturned thinned rim and carinated at the junction with tapering sides. Of fine fabric, reddish core, showing mica in the paste, it is treated with red wash.

6. Fragment of a basin of grey ware with an inturned thinned rim having one rib on the exterior and tapering sides. Of medium fabric, grey core, showing mica in the paste, it is treated with grey wash.

7. Fragment of a basin of red ware with a vertical featureless externally ribbed rim and tapering sides. Of medium fabric, showing mica in the paste, it is treated externally with red slip.

8. Fragment of a basin of pale-red ware with a nail-headed rim, convex sides and lug-handles on either side. Of gritty coarse fabric, it is pale-red from inside and pale-grey from outside due to firing effect.

9. Fragment of a dish of dull-red ware with a nail-headed rim, convex sides and a slight carination below the neck. Of medium fabric, showing mica in the paste, it is treated with dull-red wash.

10. Fragment of a dish of red ware with a flat-headed externally beaked rim, convex sides and carinated below the neck. Of gritty coarse fabric, showing mica in the paste, it is devoid of any surface treatment.

11. Fragment of a dish of pale-red ware with an externally beaked rim and convex sides. Of gritty coarse fabric, reddish core, it is treated with pale-red wash.

12. Fragment of a bowl of grey ware with a vertical featureless rim and convex sides. Of fine fabric, showing mica in the paste, it is treated with wash.

13. Fragment of a bowl of black-slipped ware with a vertical featureless rim, almost straight sided with a recess at the junction at base. Of fine fabric, grey core, it is

treated both externally and internally with thick black slip giving the impression of polished smooth surface.

14. Fragment of a bowl of black-slipped ware with a featureless rim, convex sides and carinated at the junction at base. Of fine fabric, grey core, showing mica in the paste, it is treated both externally and internally with black wash.

15. Fragment of a dish of painted grey ware with a vertical featureless rim and convex dies. Of fine fabric, grey core, showing mica in the paste, and is treated with a wash.

16. Fragment of a bowl of grey ware with an incurved thickened rim and convex sides. Of fine fabric, grey core, showing mica in the paste, it is treated with wash.

17. Fragment of a bowl of pale-red ware with an inturned thinned rim and tapering sides. Of medium fabric, showing mica in the paste, it is devoid of any surface treatment.

18. Fragment of a bowl-cum-lid of red ware with a folded rim having sharpened lip and tapering sides. Of medium fabric, showing mica in the paste, it is treated with a wash.

19. Fragment of a basin of red ware with nail headed rim and convex sides. Of gritty coarse fabric, showing mica in the paste, it is treated with wash.

20. Fragment of bowl-cum-lid of pale-red ware with a folded rim having a sharpened lip and tapering sides. Of fine fabric, showing mica in the paste, it is treated with wash.

21. Fragment of a dish of pale-red ware with an incurved rim and carinated at the junction with base. Of medium fabric, showing mica in the paste, it is treated with pale-red wash.

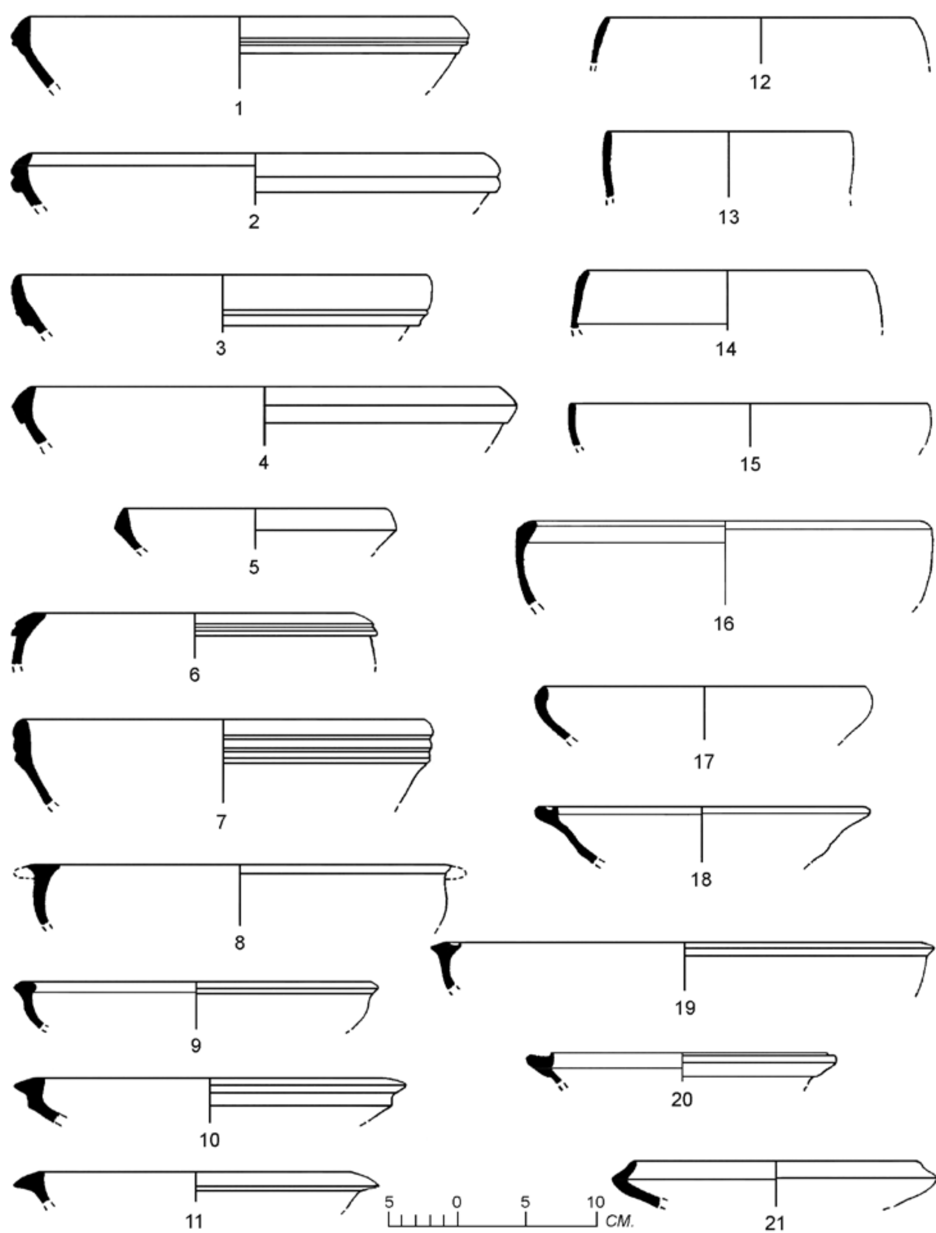


Fig.23. Northern Black Polished Ware (Pd III)

Fig. 24

1. Fragment of a vase of pale-red ware with an everted featureless rim and expanding sides. Of fine fabric, showing mica in the paste, it is treated with pale-red wash.

2. Fragment of a vase of red ware with a vertical, externally collared and grooved rim. Of fine fabric, showing mica in the paste, it is treated with red slip.

3. Fragment of a jar of dull-red ware with a rim externally collared having four ribs on the exterior and concave neck. Of coarse fabric, greyish core, it is light black due to ill-firing.

4. Fragment of a jar of grey ware with an externally collared rim having two ribs on the exterior and concave neck. Of coarse fabric, rough surface, showing mica in the paste, it is devoid of any slip or wash.

5. Fragment of a bowl of dull-red ware with an externally collared rim having a groove. Of fine fabric, showing mica in the paste, it is treated with dull-red slip.

6. Fragment of a jar of pale-red ware with an out-turned thickened rim and concave neck. Of coarse fabric, greyish core, showing mica in the paste, it is treated with pale-red wash.

7. Fragment of a jar of dull-red ware with an out-turned thickened rim and expanding sides. Of gritty coarse fabric, blackish core, the paste shows a great deal of mica.

8. Fragment of a vase of red ware with an externally beaded rim. Of fine fabric, showing mica in the paste, it is treated with red slip.

9. Fragment of a bowl of pale-red ware with an oblique externally cordoned rim and tapering sides. Of medium fabric, showing mica in the paste, it is treated with pale-red wash.

10. Fragment of a miniature vase of pale-red ware with an out-turned featureless rim and concave neck. Of fine fabric, showing mica in the paste, it is treated with pale-red wash.

11. Fragment of a vase of pale-red ware with a vertical thinned rim, concave neck, and carinated both at shoulder and belly. Of fine fabric, showing mica in the paste, it is treated with pale-red wash.

12. Fragment of a bowl-cum-lid of pale-red ware with a folded rim and tapering sides. Of medium fabric, greyish core, showing mica in the paste, it is treated with pale-red wash. It is greyish from inside due to inverted firing.

13. Fragment of a bowl-cum-lid of red ware with a folded rim and tapering sides. Of medium fabric, showing mica in the paste, it is black from outside due to ill-firing.

14. Fragment of a bowl-cum-lid of red ware with a vertical externally cordoned rim and concave sides. Three grooves are also visible on the exterior of body. Of fine fabric, showing mica in the paste, it is treated with red slip.

15. Fragment of a dish of grey ware with an obliquely cut rim and tapering sides. Of fine fabric, greyish core, showing mica in the paste, it is devoid of any slip or wash.

16. Fragment of a jar of pale-red ware with a vertical thickened rim and concave neck. Of medium fabric, greyish core, showing mica in the paste, it is devoid of any slip or wash.

17. Spouted vase of pale-red ware with an out-turned thickened rim, concave neck, globular body and rounded base. One groove is also visible on the rim. Of medium fabric, showing mica in the paste, it is devoid of any slip or wash.

18. Fragment of a miniature pot of pale-red ware with a closing inturned tinned rim and sides carinated to possibly rounded base. Of fine fabric, showing mica in the paste, it is treated with wash.

19. Fragment of a miniature bowl of red ware with a vertical thinned rim, convex sides and rounded base. Of fine fabric, showing mica in the paste, it is treated with slip.

20. Fragment of a miniature vase of red ware with an out-turned thinned rim and round body. Of fine fabric, showing mica in the paste, it is treated externally with red wash.

21. Fragment of a miniature vase of red ware with an out-turned thickened rim, concave neck and possibly round body. Of fine fabric, showing mica in the paste, it is treated externally with red wash.

22. Fragment of a bowl of pale-red ware with an internally thinned rim, tapering sides and flat base. Of medium fabric, greyish core, showing mica in the paste, it is treated with pale-red wash.

23. Fragment of a miniature vase of pale-red ware with an out-turned rim, concave neck and convex body. A row of oblique incision is also visible on the shoulder. Of fine fabric, showing mica in the paste, it is treated externally with pale-red wash.

24. Fragment of a bowl of grey ware with a vertical thinned rim and almost straight sides. Of fine fabric, grey core, showing mica in the paste, it is treated with grey wash.

25. Fragment of a bowl of grey ware with a vertical thinned rim and almost sides. Of fine fabric, grey core, showing mica in the paste, it is treated with grey wash.

26. Fragment of a bowl of grey ware with a vertical thinned rim and expanding sides. Of fine fabric, grey core, showing mica in the paste, it is treated with grey wash.

27. Fragment of a bowl of grey ware with an out-turned thinned rim, almost straight sides and carinated at the junction with round base. Of fine fabric, grey core, showing mica in the paste, it is treated with grey wash.

28. Fragment of a bowl of grey ware with a vertical externally grooved rim, convex sides and having a groove at the carinated junction with possibly round base. Of fine fabric, grey core, showing mica in the paste, it is treated externally with dark grey wash.

29. Fragment of a dish of painted grey ware with a vertical externally grooved rim and convex sides of fine fabric, grey core.

30. Fragment of a dish of dull red ware with an inturned thinned rim and convex sides of medium fabric, showing mica in the paste, it is treated with red wash.

31. Fragment of a vase of pale-red ware with a vertical externally bevelled rim and expanding sides. Of fine fabric, showing mica in the paste, it is treated with pale-red wash.

32. Fragment of a vase of dull-red ware with an out-turned thinned rim and convex sides. Of medium fabric, showing mica in the paste, it is devoid of any slip or wash.

33. Basal fragment of a bowl of grey ware with raised sides and carinated at the junction with flat base, fine fabric, grey core, showing mica in the paste, it is treated with grey wash.

34. Fragment of a miniature vase of red ware with an externally beaded rim and expanding sides. Of fine fabric, showing mica in the paste, it is treated with red wash.

35. Fragment of a basin of black-slipped ware with a vertical nail-headed rim and having a loop-handle on either side. Two incised strokes on either side of loop-handle and three on the top are also visible. Body carinated at the junction with base. Of medium fabric, grey core, showing mica in the paste, it is treated with black pigment.

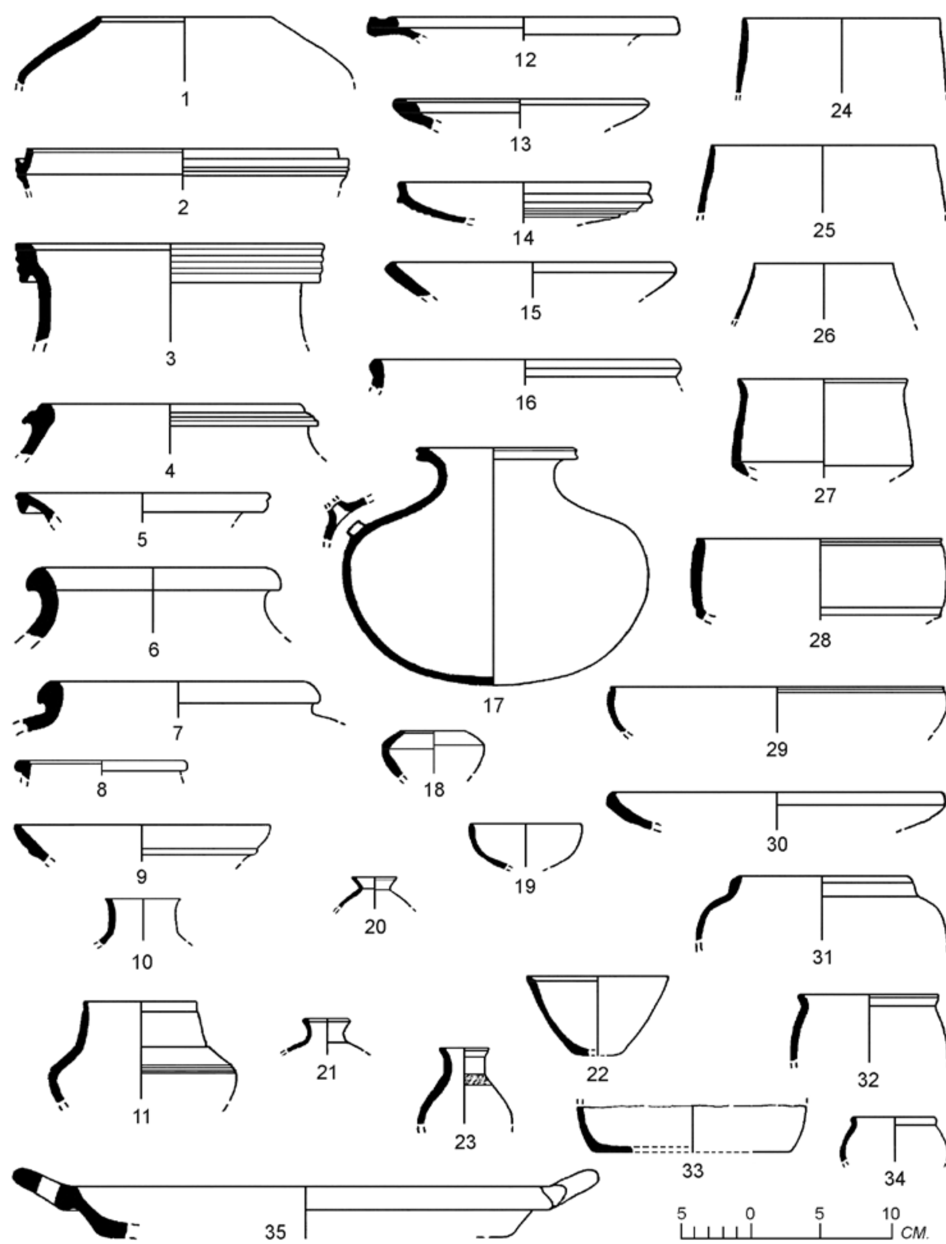


Fig.24. Northern Black Polished Ware (Pd III)

Plate



Pl. XX. A high double storage jar (Period III)

PERIOD IV

The pottery from this period is entirely represented by sherds of red ware except one sherd of dull grey ware, striation marks on the body show that pots were made on a fast wheel. The pottery is of fine to medium in fabric. Mica is also used as a tempering material. Large percentage of pottery is treated with slip although wash have also been found in some cases. Some of the potsherds are found painted in black pigment. The designs included are horizontal bands on rim, shoulder and belly. Painted designs are also visible in interior side of the rim in same manner as in exterior, few sherds bear stamped designs on the shoulder. The lower portion of few sherds is coated with sand and paste.

The important shapes of this period are vases having externally thickened rim, nail headed rim, collared rim, splayed out collared rim, bottle necked rim, straight necked jar and expanding sides with less pronounced depressions on the shoulder, basins with nail headed rim, beakers and bowls with featureless rim.

Fig. 25

1. Vase of dull-red ware with an out-turned externally undercut rim, round body and concave neck. One groove is also visible on the top of rim. Of medium fabric, showing mica in the paste, it is treated with wash and painted in black pigment with oblique strokes and a row of loops within groups of horizontal bands on the body. Four groups with two strokes each are also visible on the top of rim.

2. Vase of dull-red ware with an out-turned externally undercut rim, almost round body and concave neck. One groove is also visible on the top of rim. Of medium fabric, showing mica in the paste, it is treated with wash.

3. Vase of dull-red ware with an externally thickened rim and concave neck of medium fabric, greyish core, showing mica in the paste, it is devoid of any slip or wash.

4. Vase of red ware with a nail-headed rim, slightly undercut from inside and concave neck. Of medium fabric, showing mica in the paste, it is treated with red slip on the outside and upto the neck inside. Due to the fast wheel the striations on the neck are prominent and appear as ribs. A row of impressed designs on the shoulder is also visible.

5. Fragment of a jar of red ware with a horizontally splayed out nail-headed rim, forming a channel inside at the joint of concave neck. Of fine fabric, it is treated with red wash and painted in black pigment with a row of vertical leaf type

strokes on the rim, a horizontal band on the neck and a thick band covering the inner side upto the neck.

6. Fragment of a vase of red ware with an externally collared rim, undercut from inside and concave neck. One prominent groove is also visible on the outside of rim. Of fine fabric, showing mica in the paste, it is treated with red slip on the outside and painted in black pigment with horizontal bands on the neck and body.

7. Fragment of a small dish of red ware with a flat-headed rim curved towards the flat base. One groove is also visible on the top of rim. Of medium fabric, showing mica in the paste, it is devoid of any slip or wash. It is decorated on inside with incised loops.

8. Fragment of a vase of red ware with a vertical externally ribbed rim. Of medium fabric, showing mica in the paste, it is devoid of any surface treatment.

9. Fragment of a vase of red ware with a vertical externally collared rim and concave neck. Of medium fabric, greyish core, showing mica in the paste, it is devoid of any slip or wash.

10. Vase of red ware with an out-turned obliquely cut rim, almost straight sides and flat base. Of medium fabric, showing mica in the paste, it is devoid of any slip or wash.

11. Fragment of a vase of red ware with flat base and convex sides. Of medium fabric, showing mica in the paste, it is treated with red slip and painted in black pigment on the outside with thick horizontal bands. Four less pronounced grooves are also visible on the outside. The interior surface of the pot is tampered with sand.

12. Jar of red ware with a splayed out externally collared rim and convex neck. One groove is also visible on the top of rim. Of medium fabric, greyish core, showing mica in the paste, it is treated with red wash and painted in black pigment with horizontal band on the inner side of rim and horizontal bands on the shoulder.

13. Vase of red ware with a splayed out externally beaked rim and having a ledge on the neck. Of medium fabric, showing mica in the paste, it is treated with red slip and painted in black pigment with horizontal band on the shoulder.

14. Vase of red ware with a splayed out externally thickened rim, having a cordon below it, a narrow neck and globular profile. Of medium fabric, showing mica in the paste, it is treated with red slip on the outside and upto the neck inside and painted in black pigment with horizontal bands on the rim, neck, shoulder and belly.

15. Vase of red ware with an out-turned slightly drooping rim and having a ledge on the neck. Of medium fabric, showing mica in the paste, it is treated with red slip and painted in black pigment with horizontal bands on the shoulder.

16. Fragment of a vase of bright red ware with an externally cordoned rim and concave neck. Of fine fabric, showing mica in the paste, it is treated with red slip and painted in black pigment with one horizontal band on the rim and three on the shoulder. Row of loops is visible on the inner side or rim.

17. Fragment of a vase of bright red ware with an externally cordoned rim and concave neck. Of fine fabric, showing mica in the paste, it is treated with red slip on the outside and upto the neck inside and painted in black pigment with one horizontal band on the rim and three on the shoulder.

18. Carinated *handi* of red ware with an externally beaked rim, depressed from inside, concave neck, ribbed shoulder and flat base. Of medium fabric, showing mica in the paste, it is treated with red slip and painted in black pigment with horizontal bands on the shoulder and belly.

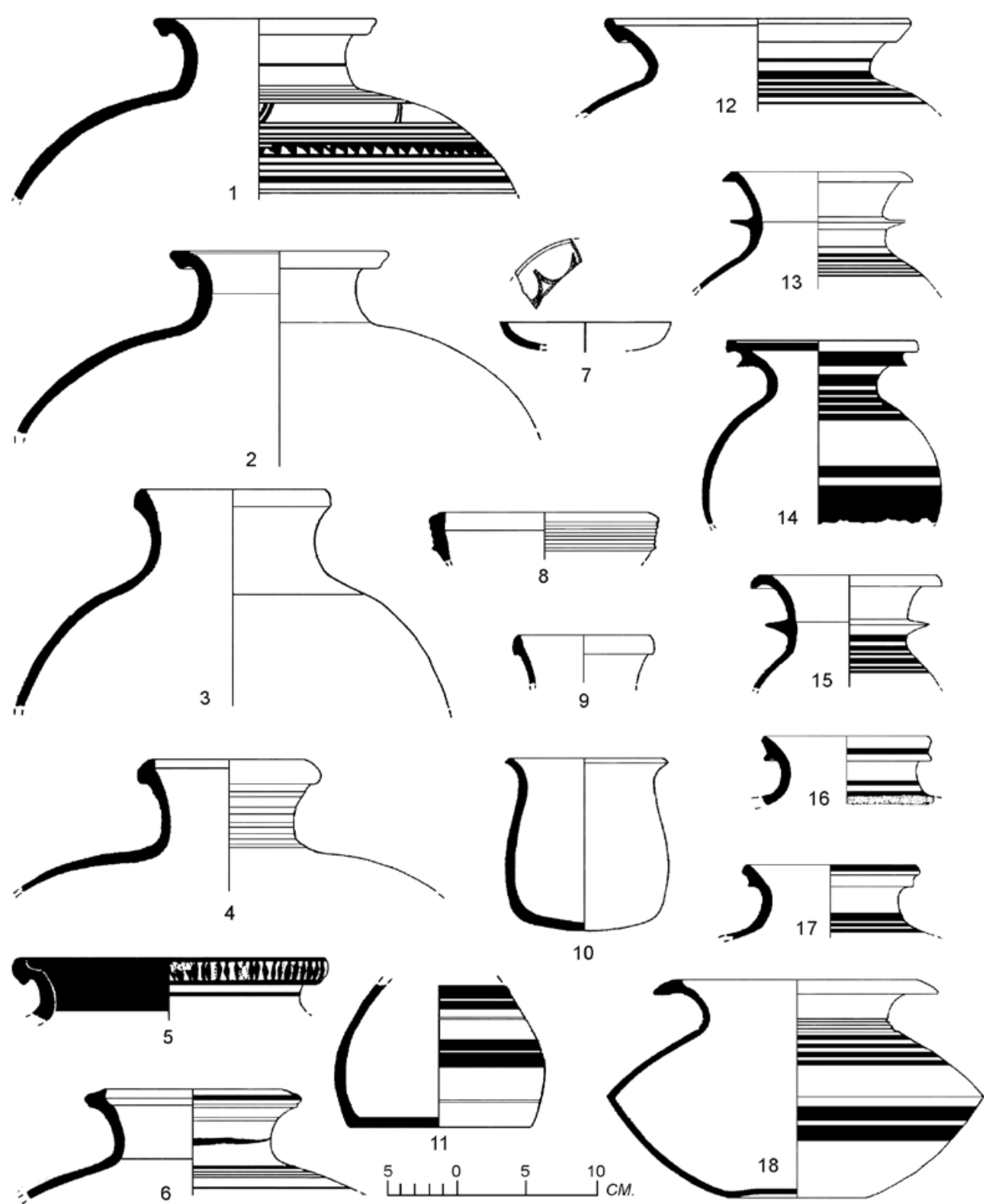


Fig.25. Pottery (Pd IV)

Fig. 26

1. Vase of red ware with an externally collared rim, concave neck and almost round body. Of medium fabric, showing mica in the paste, it is treated with red slip and painted in black pigment with group of horizontal bands on rim, shoulder and belly, horizontal bands on the shoulder are crossed with oblique strokes.

2. Fragment of a vase of red ware with an externally collared and ribbed rim and concave neck. One rib on the shoulder is having incised decoration. Of medium fabric, showing mica in the paste, it is treated with red wash.

3. Spouted vase of red ware with an externally beaked rim, narrow neck, globular profile and ring base. Of fine fabric, showing mica in the paste, it is treated with red wash.

4. Miniature vase of dull-red ware with an out-turned featureless rim, concave neck and threaded flat base. Of fine fabric, it is devoid of any surface treatment.

5. Spouted vase of red ware with an externally collared rim, concave neck, globular body and flat base. Two less pronounced grooves are visible on the shoulder. Of medium fabric, showing mica in the paste, it is treated with red slip on the outside and upto the neck inside.

6. Spouted vase of dull-grey ware with concave narrow neck, expanding sides and disc base. Of medium fabric, greyish core, showing mica in the paste, it is devoid of any surface treatment. A row of incised dots is visible on the shoulder. One less pronounced groove each on the neck and shoulder and two on the belly are also visible.

7. Spouted vase of dull-grey ware with an externally collared rim, narrow concave neck, expanding sides and base. Of medium fabric, showing mica in the paste, it is devoid of any surface treatment. Less pronounced grooves are visible on the body.

8. Spouted vase of red ware with expanding sides and disc base. Of fine fabric, showing mica in the paste, it is treated with red slip and painted in black pigment with horizontal bands on the shoulder and belly. One less pronounced rib is visible under the belly.

9. Vase of dull-red ware with concave neck, expanding sides and threaded disc base. Two less pronounced grooves are visible on the belly. Of medium fabric, showing mica in the paste, it is treated with wash.

10. Miniature vase of dull-red ware with an externally thickened rim, concave neck, expanding sides and threaded disc base. One groove is visible on the belly. Of medium fabric, showing mica in the paste, it is treated with wash.

11. Miniatures vase of dull-red ware with a featureless rim, concave neck and threaded disc base. Of fine fabric, showing mica in the paste, it is devoid of any surface treatment.

12. Vase of red ware with an out-turned collared rim, concave neck, globular profile and round base. One rib is visible on the shoulder. Of medium fabric, showing mica in the paste, it is treated on the neck and shoulder with red slip and remaining lower portion is coated with sand paste.

13. Vase of red ware with an out-turned collared rim, concave neck and globular profile. Four less pronounced grooves are visible on the shoulder. Of medium fabric, showing mica in the paste, it is treated with red slip on the neck and shoulder and upto the neck inside and remaining lower portion is coated with sand paste.

14. Vase of red ware with an out-turned collared rim, concave neck and expanding sides. Of medium fabric, greyish core, showing mica in the paste, it is treated with red slip on the neck and shoulder and upto the neck inside and remaining lower portion is coated with thick sandy paste after regular gaps.

15. Vase of red ware with an externally collared rim and concave neck. less pronounced ribs on the neck and one groove on the shoulder are also visible. Of coarse fabric, greyish core, showing mica in the paste, it is treated with red slip on the outside and upto the neck inside. The shoulder is decorated with stamped designs with groups of incised strokes arranged in a row.

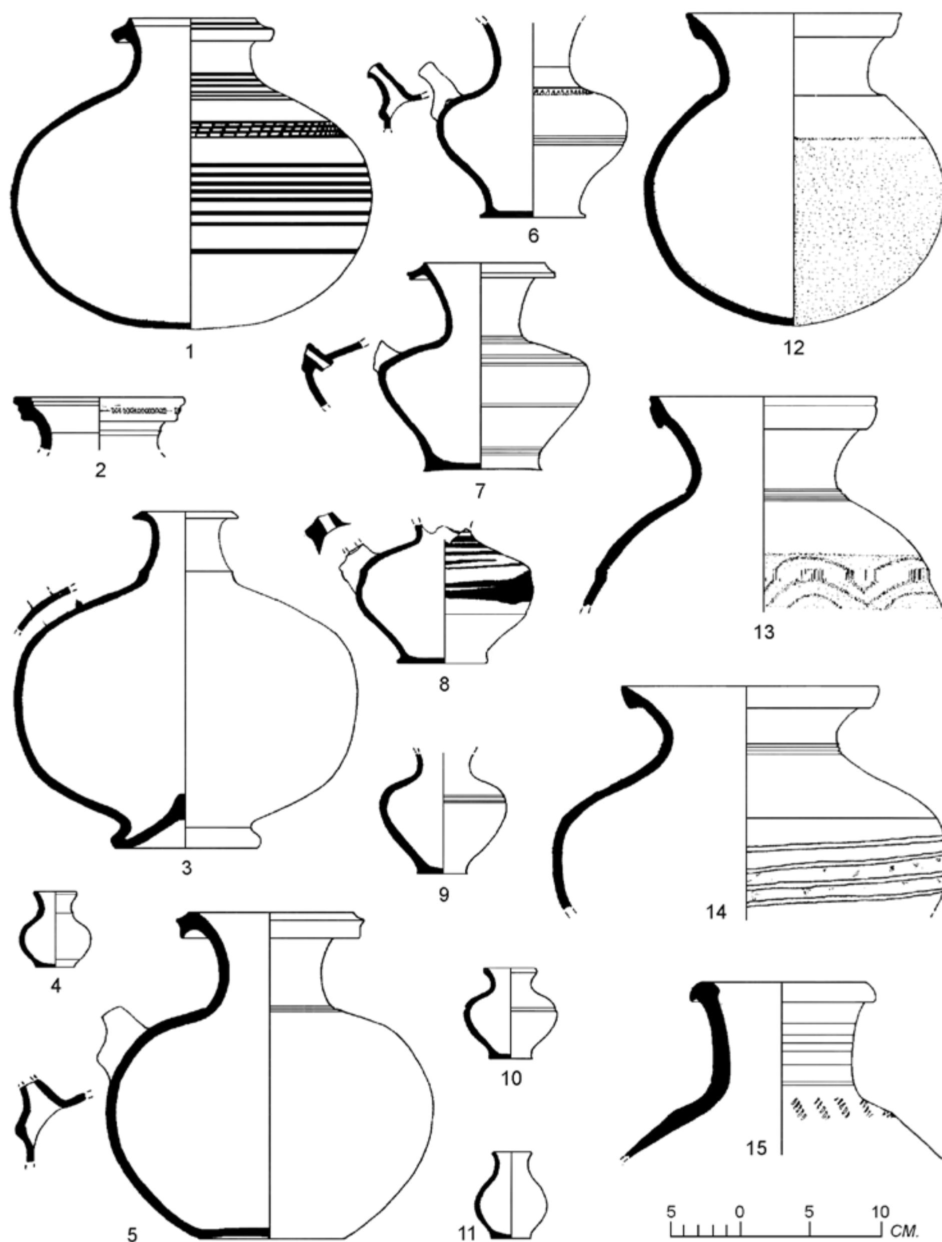


Fig.26. Pottery (Pd IV)

Fig. 27

1. Jar of dull-red ware with an out-turned rim, concave neck and expanding sides. Of gritty coarse fabric, showing mica in the paste, it is devoid of any surface treatment.

2. Vase of red ware with an externally beaked rim, carinated on the outside below the concave neck. Of medium fabric, showing mica in the paste, it is treated externally with wash.

3. Fragment of a jar of red ware with an externally triangular collared rim. A group of incised decoration and two grooves are visible on the top of rim. Of medium fabric, showing mica in the paste, it is treated with red slip and painted in black pigment with double leeps on the top of rim. Two grooves on the shoulder are also visible.

4. Fragment of a jar of red ware with an externally collared rim and depressed from inside. Of medium fabric, showing mica in the paste, it is treated with red slip and painted in black pigment with oblique strokes on the top and exterior side of rim.

5. Fragment of a vase of red ware with an externally collared rim. Of medium fabric, showing mica in the paste, it is treated externally with red slip.

6. Fragment of a vase of red ware with an externally collared and grooved rim and concave neck. Of medium fabric, showing mica in the paste, it is treated with red slip.

7. Fragment of a vase of dull-red ware with a featureless of rim. Of medium fabric, showing mica in the paste, it is devoid of any surface treatment.

8. Fragment of a bottle-necked vase of red ware with almost straight neck and slightly grooved shoulder. Of fine fabric, showing mica in the paste, it is treated externally with red slip.

9. Closed lid of dull-red ware with a pointed perforated finial, globular body and threaded disc base. Of fine fabric, showing mica in the paste, it is treated externally with dull-red wash.

10. Fragment of a bottle-necked sprinkler with almost straight neck. A slanting hole in the neck is also visible. Of fine fabric, showing mica in the paste, it is treated externally with red slip.

11. Fragment of a bottle-necked sprinkler with almost straight neck and expanding sides. a slanting hole in the neck and depression on the shoulder is also visible. Of fine fabric, showing mica in the paste, it is treated externally with red slip.

12. Fragment of a bottle-necked sprinkler with expanding sides and less pronounced depression on the shoulder. Of fine fabric, showing mica in the paste, it is treated on the outside with red slip.

13. Miniature vase of dull-red ware with a grooved rim, concave neck, expanding sides and threaded flat base. Of fine fabric, showing mica in the paste, it is treated with wash. Two less pronounced grooves are visible on the shoulder.

14. Beaker of dull-red ware with an obliquely cut rim, concave neck, almost straight sides and a flat base. Two groups with two grooves each are visible on the body. Of fine fabric, showing mica in the paste, it is devoid of any surface treatment.

15. Miniature vase of dull-red ware with a featureless rim, concave neck and threaded disc base. Of fine fabric, showing mica in the paste, it is devoid of any surface treatment.

16. Fragment of a vase of dull-red ware with an externally thickened rim. Of medium fabric, showing mica in the paste, it is treated with wash.

17. Vase of red ware with an externally collared and grooved rim, depressed from inside, concave neck and expanding sides. Of medium fabric, showing mica in the paste, it is treated with red slip on the outside and upto the neck inside and painted in black pigment with horizontal bands on the neck and shoulder. Two strokes on the top of rim are also visible.

18. Fragment of a vase of dull-red ware with an externally collared rim. Prominent ribs are visible on the neck. Of medium fabric, showing mica in the paste, it is devoid of any surface treatment.

19. Basin of dull-red ware with a nail-headed rim having an appliqué lamp on the top. Of medium fabric, it is treated both externally and internally with dull-red slip.

20. Bowl of dull-red ware with a flared featureless rim having three appliqué lamps on the top of rim. Of medium fabric, showing mica in the paste, it is devoid of any surface treatment.

21. Bowl of dull-red ware with an obliquely cut rim, corrugated sides and tapering towards a threaded flat base. Of medium fabric, showing mica in the paste, it is devoid of any surface treatment.

22. Bowl of dull-red ware with an in-turned thickened rim and tapering sides. The body is having less pronounced corrugations. Of medium fabric, showing mica in the paste, it is devoid of any surface treatment.

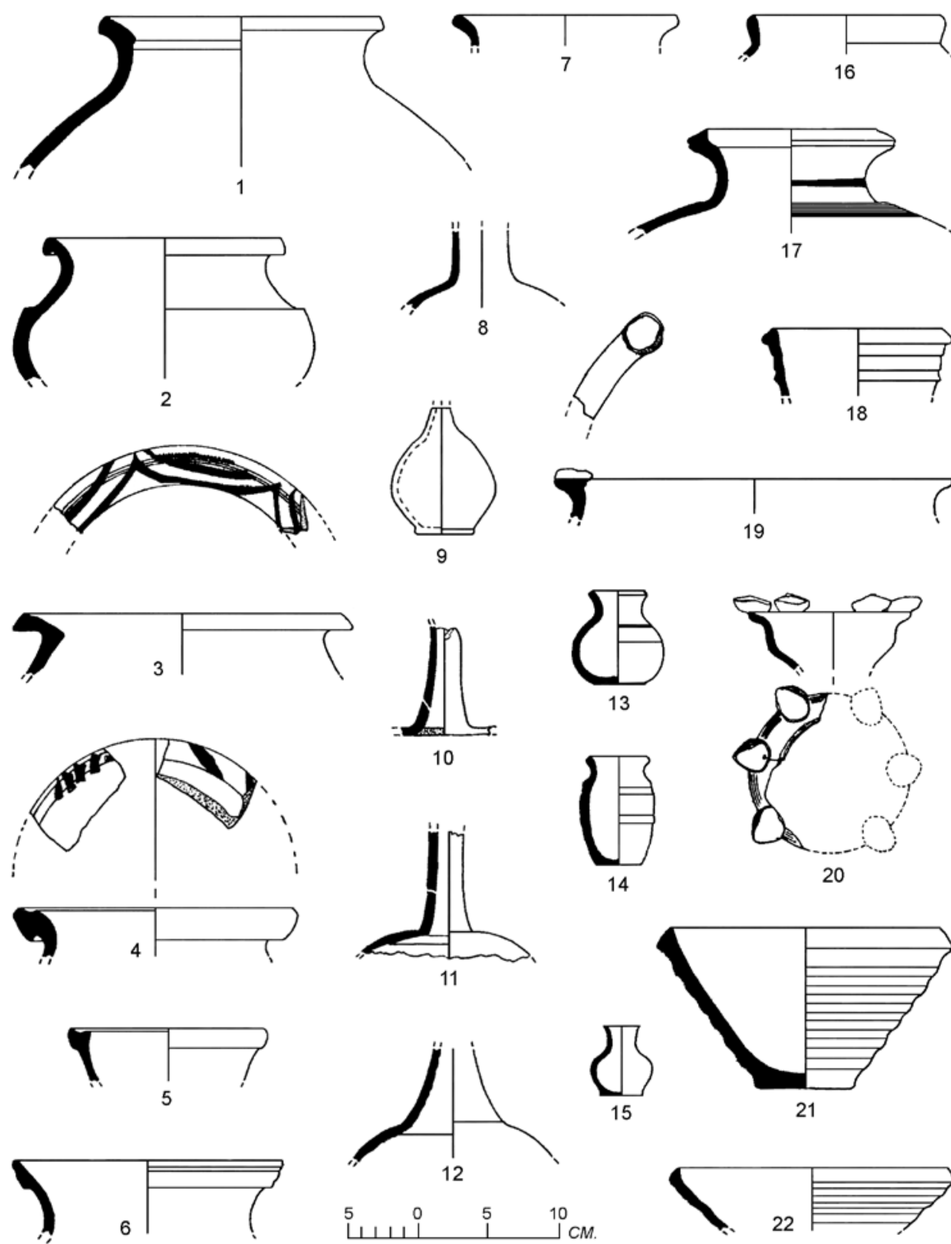


Fig.27. Pottery (Pd IV)

PERIOD V

This period yielded minimum number of sherds. The potsherds available for study are only those of red ware, having medium fabric. The maximum sherds are treated with red slip or wash both externally and internally but few of them are devoid of any surface treatment.

The important shapes of this period are bowls with externally bevelled rim, thinned rim, vertical thickened rim, externally sharpened rim, most of them are decorated with moulded designs having arch type, floral leaf, triangles striking oblique lines and alternate leaf type designs. Only specimens of vase with out-turned externally grooved rim decorated with cord designs made by twisting at two opposite places of rim are noticed. Two complete incense burners with sharp handle and a hollow pedestal are also encountered.

Fig. 28

1. Bowl of red ware with an out-turned externally grooved rim which is decorated with a cord-design made by twisting at two opposite places of the rim. The body of the vase is convex sided with a blunt carination below the shoulder on the exterior. Of medium fabric, it is treated with red slip above the belly on the outer side and upto the neck on the inner side. Special mention may be made of this red ware sherd with a 'swan' flanked by amorous couple **(Pl. XXI)**.

2. Bowl of red ware with an externally bevelled rim and tapering corrugated sides. Of medium fabric, it is devoid of any surface treatment.

3. Bowl of red ware with an internally sharpened rim, convex sides and decorated with a moulded design depicting opposite loops in a panel. Of medium fabric, slightly greyish core, it is treated both internally and externally with red slip.

4. Bowl of red ware with an externally thinned rim, convex sides, round body and decorated with a moulded design depicting arch type design in a panel. The arches are filled with two dots each. Of medium fabric, it is treated with red slip both internally and externally.

5. Bowl of red ware with a vertical thickened rim, and a rounded base, decorated with a moulded design, depicting floral leaf design within two horizontal panels filled with dots. Of medium fabric, it is devoid of any surface treatment.

6. Bowl of red ware with slightly incurved featureless rim, convex sides and decorated with moulded design depicting a triangle striking against a line over-lying three horizontal lines. Of medium fabric, it is treated internally with wash.

7. Bowl of red ware with an externally sharpened rim, convex sides, decorated with a moulded design depicting a row of dots and circle with spokes below two horizontal lines on the rim. Of medium fabric, it is treated both internally and externally with wash.

8. Fragment of a red ware bowl decorated with a moulded design depicting oblique lines in a panel above a horizontal line. Of medium fabric, it is treated both externally and internally with red slip.

9. Bowl of red ware with slightly out-turned featureless rim distinguished by a slip and a thickened flat base. Of medium fabric, it is treated with wash.

10. Bowl of red ware with a vertical thickened rim and convex sides decorated with a moulded design depicting alternate leaf pattern and circles with spokes below a horizontal line. Of medium fabric, it is treated both externally and internally with red slip.

11. Incense-burner of red ware with a sharpened drooping rim, a strap handle decorated with two incised lines and hollow pedestal base. Of medium fabric, it is treated with red slip but exceptionally having black spots due to ill-firing.

12. Bowl of red ware with a vertical externally thinned rim, convex sides, and almost round base, decorated with moulded design depicting a horizontal row of dots below the rim and a typical design of triangles formed by dots and lines both. Of medium fabric, it is treated both externally and internally with red slip.

13. Bowl of red ware with an out-turned thinned rim, convex sides and round base decorated with moulded design depicting oblique lines in a panel above a horizontal line. The upper line of the panel below the rim is having thick dots at regular intervals. Of medium fabric, it is treated with red slip both externally and internally.

14. Incense-burner of red ware with a horizontally splayed-out rim, a strap-handle which is further raised upto the neck on the inner side and a hollow pedestal ribbed base with three less pronounced grooves with deep vertical incised decoration on the outer side. Of medium fabric, it is treated with red slip.

15. Bowl of red ware with an externally triangular collared rim, decorated with a moulded design depicting a row of dots in a panel. Of medium fabric, slightly greyish core, it is devoid of any surface treatment.

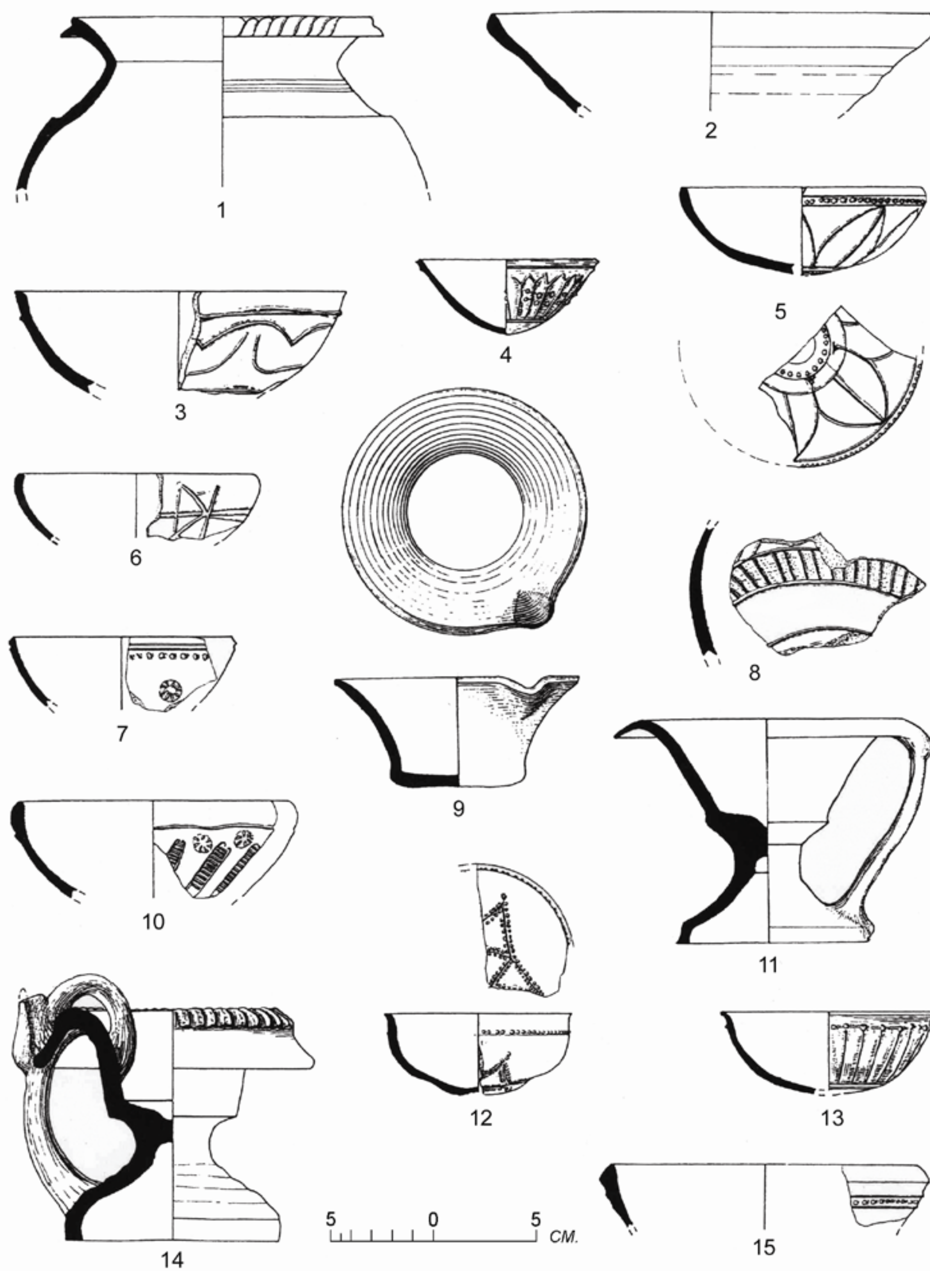


Fig.28. Pottery (Pd V)

Plate



Pl. XXI. A red ware sherd decorated with a ‘swan’ flanked by amorous couples

CHAPTER – V

Antiquities

PERIOD I

This period yielded terracotta objects like several animal figurines, twenty eight cakes, one potter anvil, an indeterminate objects (Bara type), four cart wheels, seven balls, eleven hopscotches, one bangle, one pot-handle of animal head type, semi-precious stone beads viz. carnelian, agate, faience, four bangles, one ring, one utensil fragment and one terracotta sealing bearing three Harappan signs.

Selected examples are listed below. Antiquities of special interest from unstratified context are described on stylistic ground.

Pl. I

1. Terracotta sealing bearing three Indus alphabets from an unstratified deposit (Reg. no. 990).

   Measurements: length 56.69 mm; breadth 39.17 mm; thickness 22.64 mm

Pl. II

1. Disc shaped terracotta cake with elliptical section, handmade and surface is roughened by the impression of chaffs. A finger tip depression is visible in the centre of one face (Reg. no. 1002).

   Measurements: diameter 89.95 mm; thickness 31.97 mm

2. Oval shaped terracotta cake (*Mushatika*) and surface devoid of any treatment. The potter had left the full evidence of this technique. The clay lump was put on the palm of left hand and pressed by four fingers and relieved it as it is. The impression of four fingers including palm are clearly visible (Reg. no. 887).

   Measurements: length 82.65mm; width 48.79 mm

3. An elliptical terracotta cake with lenticular section. Hand modelled and surface roughened by the chaff impressions. Impression of three fingers and left on one face-end (Reg. no. 843).

   Measurements: length 110.97 mm; maximum breadth 65.91mm; thickness 32.41 mm

4. Disc shaped terracotta cake with elliptical section. Hand modelled and surface treated with wash. Diagonal cross is incised on one face. From an unstratified deposit (Reg. no. 707).

   Measurements: diameter 101.15 mm; thickness 39.58 mm

5. Oval terracotta cake with circular section, handmade and devoid of surface treatment figurine impression is visible on one end (Reg. no. 397).

   Measurements: length 124.23 mm; diameter 58.57 mm

Pl. III

1. Terracotta ball, hand modelled and surface treated with wash (Reg. no. 266).

   Measurements: diameter 31.94 mm

2. Variant of type-4 with a depression tapering towards bottom at the top centre (Reg. no. 971).

   Measurements: height 19.00 mm; lower diameter 44.71 mm

3. Terracotta wheel of lenticular section, hand modelled, and surface treated with wash (Reg. no. 697).

   Measurements: diameter 47.02 mm; maximum thickness 12.94 mm; diameter of the hole 6.65 mm.

4. Terracotta toy, hand modelled and surface treated with wash. It rotates on the pointed bottom (Reg. no. 769).

   Measurements: height 29.21mm; lower diameter 41.81 mm.

5. Fragment of a terracotta wheel with raised circular single hub at the centre. Wheel thrown and micaceous surface is treated with wash (Reg. No. 711).

   Measurements: outer diameter 110.41 mm; thickness 27.71 mm; diameter of the hole 8.97 mm.

6. Terracotta hopscotch made from Harappan red ware, treated with slip on one end (Reg. no. 997).

   Measurements: diameter 52.96 mm; thickness 12.31mm.

7. Fragment of a hand modelled chaff (paddy husk) impressed clay and surface is also roughened by chaff-marks (Reg. no. 729).

   Measurements: height 65.68 mm; width 68.48 mm.

Pl. IV

1. Terracotta animal head, hand modelled and surface treated with slip. While pierced-pellets are attached to indicate eyes, nose shown by pin-holes and mouth by single incised stroke (Reg. no. 701).

   Measurements: length 42.82 mm; breadth 127.62 mm.

2. Terracotta fragment of a pot-handle, top depicting animal head, hand modelled and surface treated with wash (Reg. no. 399).

   Measurements: length 42.82 mm; available breadth 46.59 mm.

3. Terracotta humped bull treated with self-slip; nose and eyes are shown by pin-holes. It reminds mature Harappan tradition of Kalibangan (Reg. no. 752).

   Measurements: length 67.97 mm; breadth 19.21mm; height 58.45 mm.

Pl. V

1. Terracotta humped bull figurine showing the provision of movable and detachable head which is missing here. Fully hand modelled in two parts, body and head. It is self slipped. Among the three holes in triangle form noticed at the truncated shoulder, the upper two are perforated showing its ends at both the sides of belly to hold the string binding the head. The third one is a blind hole to hold in position the head fixed on a stick. Another blind hole seen beneath the belly is probably used to make it erected by a stick of required height (Reg. No. 544).

   Measurements: length 51.27 mm; breadth 22.51mm; height 38.53 mm

Pl. VI

1. Variant of type-3, some blackish shade is also present on this bead (Reg. no. 341).

   Measurements: diameter 34.00 mm; length 17.08 mm.

2. Terracotta twin bangles having segmented section and devoid of any surface treatment (Reg. no. 1014).

   Measurements: length 28.05 mm; width 11.40 mm.

3. Variant of type-3 in red ware (Reg. No. 267).

   Measurements: diameter 25.11 mm; length 14.33 mm.

4. Terracotta truncated barrel bi-cone bead, surface devoid of any treatment and blackish shade shows defects in firing (Reg. no. 867).

   Measurements: diameter 27.58 mm; length 14.87 mm.

5. Black colour bone stylus, having pointed butt, and surface mildly polished (Reg. no. 949).

   Measurements: length 97.02 mm; diameter 27.20 mm.

Pl. VII

1. Faience bangle fragment, having ovoid section, surface bears sliding effect, and is decorated with series of incised oblique strokes (Reg. no. 326).

   Measurements: diameter 27.23 mm; breadth 7.53 mm; thickness 5.14 mm.

2. Faience, fragment of a miniature pot decorated with incised patterns showing alternate groups of slanting lines separated by a group of areas (Reg. no. 744).

   Measurements: length 32.05 mm; breadth 22.26 mm.

3. Faience bangle fragment, elliptical section, and decorated with series of incised oblique strokes (Reg. no. 628).

   Measurements: length 21.58 mm; breadth 14.95 mm; thickness 10.66 mm.

4. Faience ring fragment, ovoid section, and one flattish face. Surface devoid of any decoration (Reg. no. 824).

   Measurements: outer diameter 19.91 mm; breadth 7.64 mm; thickness 7.03 mm.

5. Faience bangle's fragment, spherical section, devoid of any decoration (Reg. no. 705).

   Measurements: outer diameter 23.98 mm approx; thickness 3.00 mm.

Pl. VIII

Beads

1. Carnelian, long cylindrical having circular section (Reg. no. 696).

   Measurements: length 14.57 mm; diameter 4.85 mm.

2. Agate, long truncated convex bi-cone, elliptical section (Reg. no. 277).

   Measurements: length 17.44 mm; breadth 12.67 mm; thickness 7.46 mm.

3. Agate, convex bi-cone of plano-convex section having etched eye pattern in black (Reg. no. 327).

   Measurements: length 11.14 mm; breadth 12.17 mm; thickness 3.96 mm

4. Agate, long barrel having circular section (Reg. no. 318).

Measurements: length 11.38 mm; diameter 3.58 mm.

Pl. IX

Beads

1. Steatite: Barrel disc having cylindrical section (Reg. no. 855).

   Measurements: diameter 8.95 mm; thickness 1 mm.

2. Faience: Standard barrel convex bi-cone having circular section (Reg. no. 872).

   Measurements: length 4.47 mm; diameter 4.68 mm.

3. Faience: Roughly lozenge shaped, with round corner, convex top with having plain convex section, having etched eye pattern (Reg. no. 405).

   Measurements: length 20.96 mm; breadth 20.45 mm; thickness 9.40 mm.

4. Faience: Long barrel convex bi-cone having circular section (Reg. no. 813).

   Measurements: length 8.40 mm; diameter 5.86 mm.

5. Faience: Segment cane having darkish circular band (Reg. no. 334).

   Measurements: length 15.16 mm; diameter 3.62 mm.

6. Faience: Long barrel having circular section (Reg. no.766).

   Measurements: length 10.05 mm; diameter 5.40 mm.

7. Faience: Long cylindrical having circular section (Reg. no. 391).

   Measurements: length 16.12 mm; diameter 3.55 mm.

8. Faience: Long cylindrical having circular section and decorated with central dotted incised circlets (Reg. no. 263).

   Measurements: length 13.10 mm; diameter 5.12 mm.

9. Faience: Long barrel having circular section (Reg. no. 596).

   Measurements: length 16.28 mm; diameter 5.01mm.

Pl. X

1. Terracotta indeterminate object of single squarish base with two curved heads. Three grooved bands of finger-tips across the body vertically passing between two heads from base are terminated on both ends besides three fingers pressed depressions which are noticed at the end of other two sides also.

Plates



Pl. I. Harappan Sealing (Pd I)



Pl. II. Harappan terracotta cakes (Pd I)



Pl. III. Terracotta objects (Pd I)



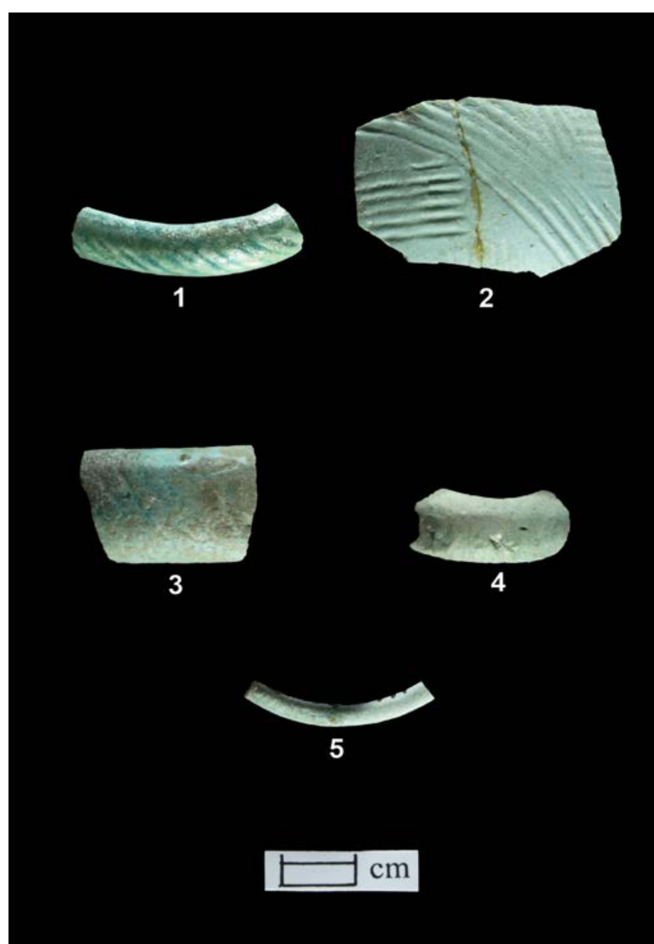
Pl. IV. Terracotta animal figurines (Pd I)



Pl. V. Terracotta humped bull (Pd I)



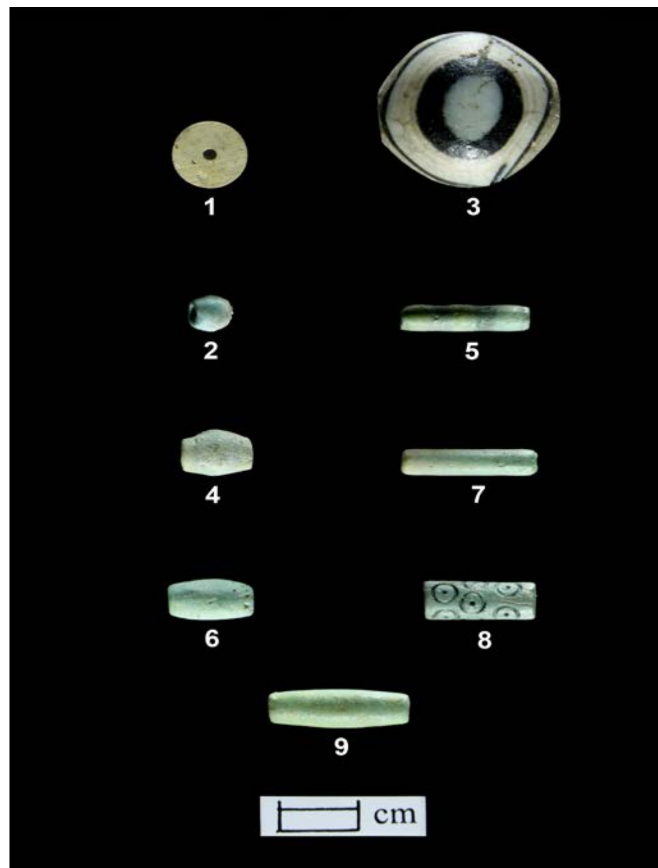
Pl. VI. Terracotta and bone objects (Pd I)



Pl. VII. Faience bangle fragments (Pd I)



Pl. VIII. Stone beads (Pd I)



Pl. IX. Steatite and faience beads (Pd I)



Pl. X. Indeterminate terracotta object (Pd I)

PERIOD II

Other Finds

Other finds unearthed from Period II are terracotta objects comprise two amulets, one wheel, two balls, one spindle whorl, one disc, forty eight hopscotches, three bangles, eight beads, alongwith one sandstone bead, one faience bead, one stone muller and one stone ball.

Pl. XI

A female terracotta figurine with prominent conical breast has a flat back and coarse surface (Reg. no. 1603). The head being broken, it reveals stump like conical arms on sides. Below thin waist is seen naval and a horizontal band of holes representing a girdle. It was found in trench XZ9, Qd. 2 at the depth of 1.55 m. From Bhagwanpura and Jakhera similar terracotta figurines displaying this precursor of girdle has been reported from PGW levels.

Measurements: length 49.96 mm; breadth 39.73 mm; thickness 14.55 mm

Pl. XII

1. Terracotta fragment probably of an amulet. Hand modelled and devoid of surface treatment. Two perforated holes side by side are noticed. From the mid level of Period II (Reg. no. 1016).

   Measurements: length 37.97 mm; breadth 33.42 mm; thickness 11.78 mm.

2. Terracotta ball, hand modelled and surface treated with slip. A diagonal cross is incised on one face. From the mid level of Period II (Reg. no. 1015).

   Measurements: diameter 32.54 mm.

3. Terracotta amulet of oblong shape and rectangular section. Hand modelled and devoid of surface treatment. Cluster of pin-holes are noticed on three of its sides and a perforated hole for suspension at the top. From a mid level of Period II (Reg. no. 886).

   Measurements: length 42.81 mm; breadth 35.88 mm; thickness 21.94 mm.

4. Ball of sandstone. From the mid level of Period II (Reg. no. 658).

   Measurements: diameter 64.37 mm.

5. Stone pestle, originally a pebble, rubbed out working face is very prominent. From a mid level of Period II (Reg. no. 337).

   Measurements: length 58.67 mm; breadth 59.09 mm; thickness 35.07 mm

Pl. XIII

1. Terracotta bead: Short truncated convex bi-cone barrel of circular section of black ware and devoid of surface treatment. From mid level of Period II (Reg. no. 891).

   Measurements: diameter 25.87 mm; length 17.03 mm; diameter of the hole 5.23 mm.

2. Cylindrical shaped faience bead (Reg. No. 929).

   Measurements: length 9.82 mm; diameter 2.76 mm.

3. Terracotta stopper of black ware, surface treated with self slip (Reg. no. 631).

   Measurements: length 24.18 mm; maximum diameter 19.66 mm.

4. Terracotta: gadrooned oval shaped ball, devoid of surface treatment with slip. From a mid level of Period II (Reg. no. 503).

   Measurements: length 15.65 mm; diameter 23.41 mm.

5. Sandstone bead: Lozenge tetrahedron. From a mid level of Period II (Reg. no. 935).

   Measurements: length 13.87 mm.

6. Terracotta bangle fragment of pentagonal section hand modelled and devoid of surface treatment. From a mid level of Period II (Reg. no. 502).

   Measurements: outer diameter 52.33 mm; width 7.83; height 7.40 mm.

7. Terracotta vase shaped bead (Reg. no. 330).

   Measurements: diameter 27.30 mm; height 25.31 mm; diameter of the hole 13.20 mm.

8. Terracotta: Vase shaped bead, surface treated with wash. From a mid level of Period -II (Reg. no. 859).

   Measurements: diameter 27.30 mm; height 25.31 mm; diameter of the hole 13.20 mm.

9. Variant of Type-8 (Reg. no. 656).

   Measurements: diameter 25.56 mm; height 22.01 mm; diameter of the hole 10.66 mm.

10. Variant of Type-8 (Reg. no. 942).

    Measurements: diameter 19.67 mm; height 14.14 mm; diameter of the hole 9.70 mm.

Pl. XIV

1. Terracotta spindle whorl made of fine grey ware with hollow inside and perforated central hole, surface treated with slip and painted in black, groups of parallel lines on both the faces in typical PGW tradition. From a mid level of Period II (Reg. no. 956).

   Measurements: diameter 72.53 mm; thickness 24.51 mm; diameter of the hole 7.21 mm.

Pl. XV

1. Terracotta hopscotch made of fine red ware sherd. From an early level of Period II (Reg. no. 1033).

   Measurements: diameter 50.14 mm; thickness 6.48 mm.

2. Variant of type-1 without central hole made of PGW sherd. Black painted designs show circle within circle with central dot. From a mid level of Period II (Reg. no. 472).

   Measurements: diameter 37.87 mm; thickness 4.31mm.

3. Terracotta hopscotch with central hole made of grey ware sherd. From a mid level of Period II (Reg. no. 932).

   Measurements: diameter 43.16 mm; thickness 4.94 mm; diameter of the hole 7.07 mm.

4. Terracotta wheel, hand modelled and devoid of surface treatment. From a mid level of Period II (Reg. no. 541).

   Measurements: diameter 55.09 mm; thickness 5.78 mm; diameter of the hole 4.60 mm.

5. Terracotta circular disc. Of cylindrical section it is hand modelled and surface treated with slip. Both the faces are decorated with incised oblique strokes on the periphery. From a mid level of Period II (Reg. no. 928).

   Measurements: diameter 55.91 mm; thickness 12.68 mm.

Pl. XVI

1. A butted stylus of bone highly polished surface, showing pointed butt with prominent chip marks (Reg. no. 955).

   Measurements: length 118.19 mm; maximum diameter 8.53 mm.

2. A butted stylus of bone having uniformly high-polished surface. From a mid level of Period II (Reg. no. 913).

   Measurements: length 81.92 mm; maximum diameter 7.83 mm.

3. Bone point with rough sides but uniformly finished surface. From a mid level of Period II (Reg. no. 661).

   Measurements: length 75.14 mm.

4. Fragment of butted stylus of bone having uniformly highly polished surface. From an early level of Period II (Reg. no. 981).

   Measurements: length 68.15 mm; maximum diameter 8.10 mm.

5. A double-edged point of bone, chip marks are prominent on smooth surface. From a mid level of Period II (Reg. no. 650).

   Measurements: length 79.89 mm; maximum breadth 9.60 mm; thickness 5.03 mm

6. A butted stylus of bone having uniformly highly polished surface, chip marks are seen on one end (Reg. no. 885).

   Measurements: length 89.74 mm; maximum diameter 6.65 mm.

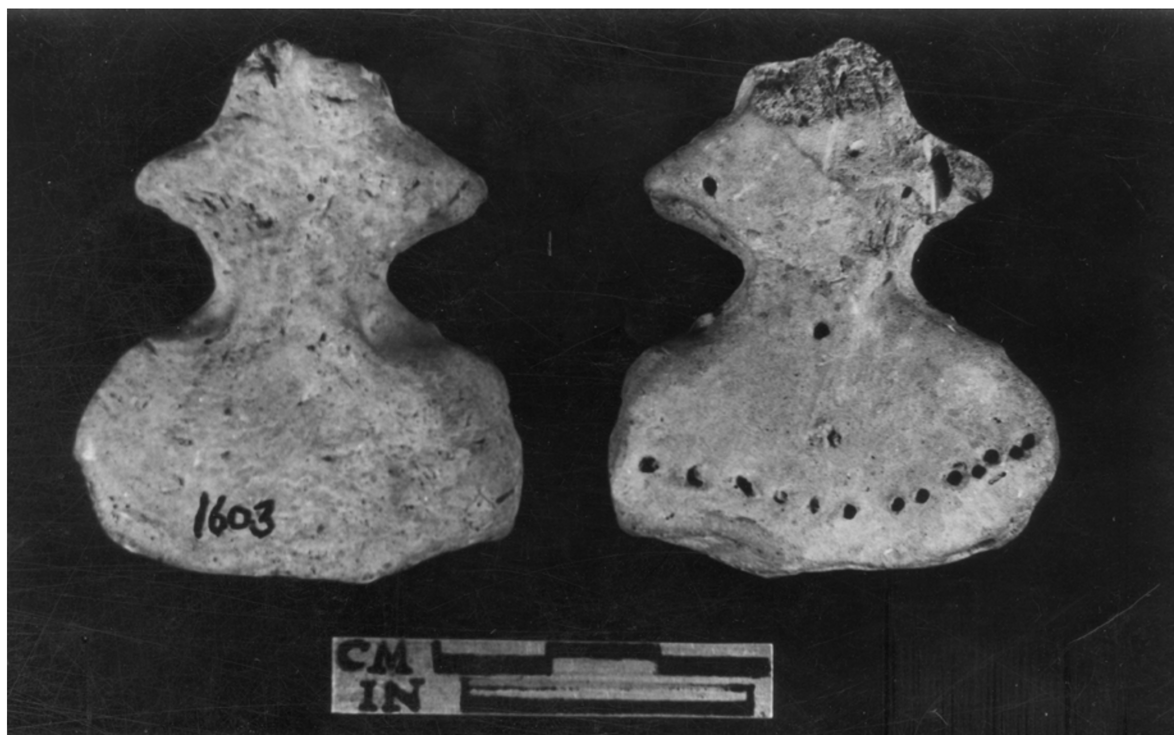
7. Antimony rod of bone having uniformly polished surface and one end is decorated with five grooves (Reg. no. 640).

   Measurements: length 74.90 mm; maximum diameter 6.33 mm.

8. Antimony rod of bone having uniformly polished surface and one end is decorated with three grooves. From a mid level of Period II (Reg. no. 931).

   Measurements: length 137.66 mm; maximum diameter 8.50 mm.

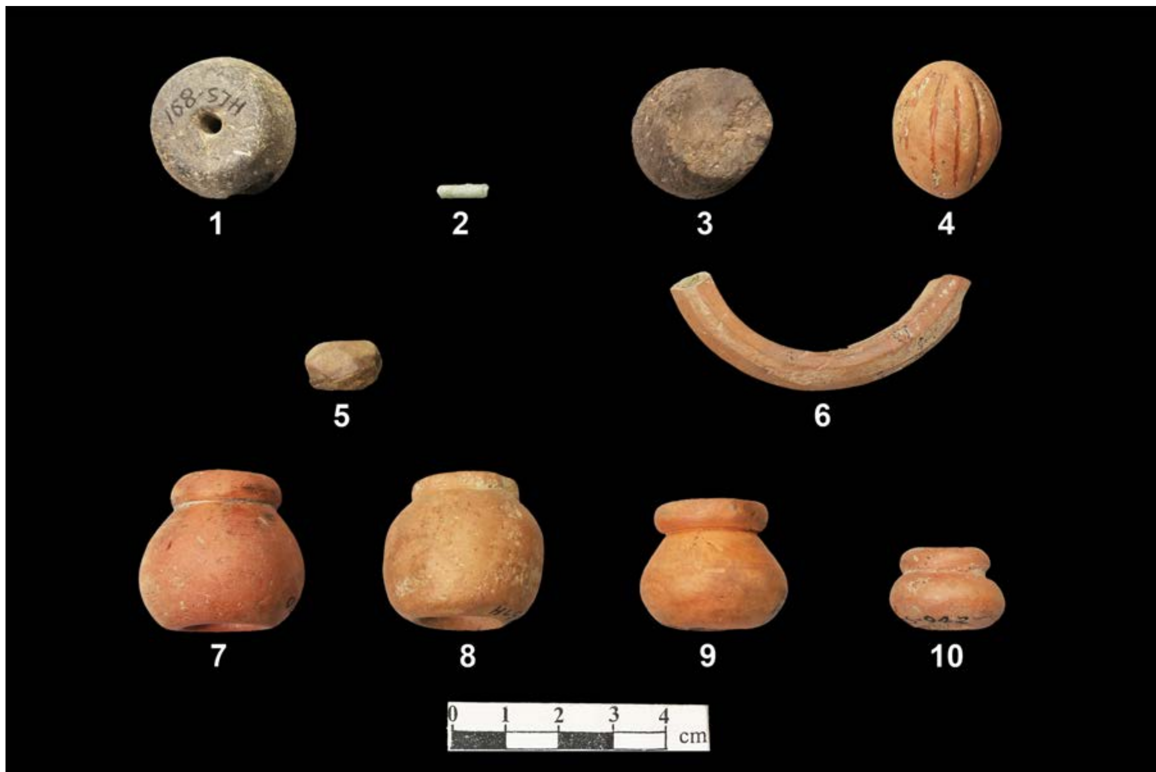
Plates



Pl. XI. Female terracotta figurine (Pd II)



Pl. XII. Terracotta objects (Pd II)



Pl. XIII. Beads, ball and bangle (Pd II)



Pl. XIV. Terracotta spindle whorl (Pd II)



Pl. XV. Terracotta hopscotch, wheel and disc (Pd II)



Pl. XVI. Bone objects (Pd II)

PERIOD III

Recovered miscellaneous objects include in terracotta two human figurines, ten animal figurines, five skin rubbers, three wheels, four balls, one gamesman, one ear stud, eleven discs, fifty-eight hopscotches, twenty-three beads, twenty-four bangle fragments along with three carnelian beads, one crystal bead, one glass bead, one bone bead, two stone pestles, two stone balls, one bangle and one ring of ivory; and in bone two double-edged points; three antimony rods, and two amulets in form of eye-goddess. Selected specimens are listed below. Antiquities from unstratified deposit are classified on stylistic ground.

Selected antiquities found from the overlapped phase of Period II and Period III are described below:

Pl. XVII

1. Terracotta bead, vase shaped truncated and surface treated with slip (Reg. no. 702).

   Measurements: maximum diameter 30.01 mm; length 13.57 mm.

2. Terracotta bangle fragment of ovoid section and devoid of any surface treatment (Reg. no. 1030).

   Measurements: approximate length 32.84 mm; maximum diameter 19.66 mm.

3. Terracotta bead, vase shaped truncated and surface treated with wash, with concave side (Reg. no. 699).

   Measurements: maximum diameter 22.36 mm; length 14.10 mm.

4. Terracotta bead, bi-cone concave barrel with circular section and surface treated with slip (Reg. no. 683).

   Measurements: maximum diameter 27.43 mm; length 17.89 mm.

5. Bone stylus, butt end is missing. Surface uniformly polished (Reg. no. 226).

   Measurements: length 80.37 mm; maximum diameter 7.86 mm.

6. Terracotta disc, surface treated with slip and both the faces are decorated with rows of incised strokes on periphery (Reg. no. 1031).

   Measurements: diameter 46.84 mm; thickness 13.37 mm.

7. Terracotta cart-frame fragment, devoid of surface treatment. Two perforated holes in vertical position at the side and one in horizontal position to hold the wheel axles are noticed (Reg. no. 802).

   Measurements: length 49.26 mm; width 23.93 mm; thickness 14.64 mm.

8. Terracotta hopscotch made of red ware sherd (Reg. no. 1032).

   Measurements: diameter 59.70 mm; length 10.50 mm.

Pl. XVIII

1. Terracotta metal casting mould of grey colour with hemispherical shape. On its working face lie seven cavities of semicircular disc shape. One perforated horizontal hole is noticed at the back side to hold the mould during work (Reg. no. 679).

   Measurements: diameter 81.44 mm; length 26.62 mm.

2. Terracotta skin rubber of rectangular shape. Faces for use are prepared by incised lines in criss-cross pattern meant for insertion of stone chips (Reg. no. 685).

   Measurements: length 95.41 mm; width 61.64 mm; thickness 19.26 mm.

Pl. XIX

1. Terracotta rectangular skin rubber with *kankar* embedded surfaces. From a mid level of Period III (Reg. no. 438).

   Measurements: length 122.27 mm; width 80.51 mm; thickness 25.31 mm.

2. Terracotta pestle shaped skin rubber with stone chips embedded on the working side. From a late level of Period III (Reg. no. 466).

   Measurements: length 66.15 mm; width 37.59 mm; thickness 28.88 mm.

3. Terracotta disc, having double concave sides. From an early level of Period III (Reg. no. 490).

   Measurements: Maximum diameter 58.42 mm; length 21.09 mm.

4. Pestle of *chunar* sand stone, surface bears typical (Mauryan) polished leaving the rubbed out working face. From an early level of Period III (Reg. no. 1024).

   Measurements: length 122.25 mm; maximum width 54.38 mm; thickness 41.02 mm.

Pl. XX

1. Stone ball having rough surface. From a mid level of Period III (Reg. no. 260).

   Measurements: Diameter 32.53 mm.

2. Hopscotch, made from red ware. From a mid level of Period III (Reg. no. 607).

   Measurements: Diameter 43.41 mm; length 7.44 mm.

3. Terracotta ball of grey ware, surface treated with wash. From a mid level of Period III (Reg. no. 27).

   Measurements: Diameter 21.39 mm.

4. Terracotta stopper of grey ware, hand modelled and devoid of surface treatment. From a late level of Period III (Reg. no. 246).

   Measurements: Diameter of the stopper 27.30 mm; length 40.05 mm.

5. Terracotta disc having flat cylindrical section and surface treated with wash. It is decorated on circumference of both the sides with oblique strokes. From a late level of Period III (Reg. no. 253).

   Measurements: Diameter 52.73 mm; thickness 17.79 mm.

6. Terracotta disc. It is decorated on circumference of both the sides with incised oblique strokes, and surface treated with red slip. From a mid level of Period III (Reg. no. 837).

   Measurements: Diameter 40.42 mm; thickness 12.83 mm.

7. Terracotta disc, variant of type 6, decorated on circumference of both the sides with incised notches. From a mid level of Period III (Reg. no. 482).

   Measurements: Diameter 35.14 mm; thickness 12.29 mm.

8. Terracotta wheel, handmade and devoid of surface treatment. From a mid level of Period III (Reg. no. 422).

   Measurements: diameter 50.10 mm; thickness 12.51 mm; diameter of the hole 7.02 mm.

Pl. XXI

Three plaquettes made of bone / tortoise shell were recorded:

1. Lower part of a plaquette presumably served as an amulet of flat section (1 mm thick). It is carved and finished frontally with uniform polish, and decorated group of four parallel horizontal bands followed by a column of dotted circlets on

alternate groups of converging lines. Its blackish colour is the result of charring. From a mid level of Period III (Reg. no. 437).

Measurements: length 37.00 mm; width 23.31mm; maximum thickness 2.62 mm.

2. The bone plaquette of slightly concave section (2 mm thick). It is carved and finished frontally as above one. Carved with central dotted circlets are used to show eyes, mouth, breasts, navel, and privy parts while horizontal bands on forehead and waist, intersecting lines on neck, and alternate groups of converging lines below are for ornamentation. Its perforated hole on fore-head was used for suspension string. From an unstratified deposit (Reg. no. 727).

   Measurements: length 55.67 mm; width 23.25 mm; maximum thickness 3.63 mm.

3. A plaquette of tortoise shell is carved on rectangular piece and finished frontally with uniform polish, on reverse side chisel marks are clearly visible, upper triangular part shows a head-dress decorated with pellets in circlets above the group of four horizontal lines, below the three pellets in circlet, upper two show eyes and lower one as mouth, further below a cross belt (*chhanvira*) on body. Both legs decorated with double oblique lines in opposite direction. Legs are shown apart and toes are turned juxtaposed. From an unstratified deposit (Reg. no. 727).

   Measurements: length 68.97 mm; width 23.17 mm; thickness 5.52 mm.

   Similar finds are known from Taxila, Ropar, Mathura and Sonkh.

Pl. XXII

1. Barrel shaped crystal bi-cone bead having circular section. From a mid level of Period III (Reg. no. 322).

   Measurements: diameter 10.74 mm; length 18.71 mm.

2. Barrel shaped glass bead of turquoise blue colour with white band. From a late level of Period III (Reg. no. 245).

   Measurements: diameter 9.33 mm; length 8.49 mm.

3. Spherical shaped carnelian bead. From a late level of Period III (Reg. no. 244).

   Measurements: diameter 7.86 mm; length 7.37 mm.

4. Barrel shaped bone bead having uniformly polished surface. From a late level of Period III (Reg. no. 448).

   Measurements: diameter 11.01 mm; length 9.40 mm.

5. Long barrel shaped carnelian bead having hexagonal section. From a late level of Period III (Reg. no. 243).

   Measurements: diameter 6.94 mm; length 22.23 mm.

Plates



Pl. XVII. Terracotta and bone objects (Pd III)



Pl. XVIII. Terracotta metal casting mould and skin rubber (Pd III)



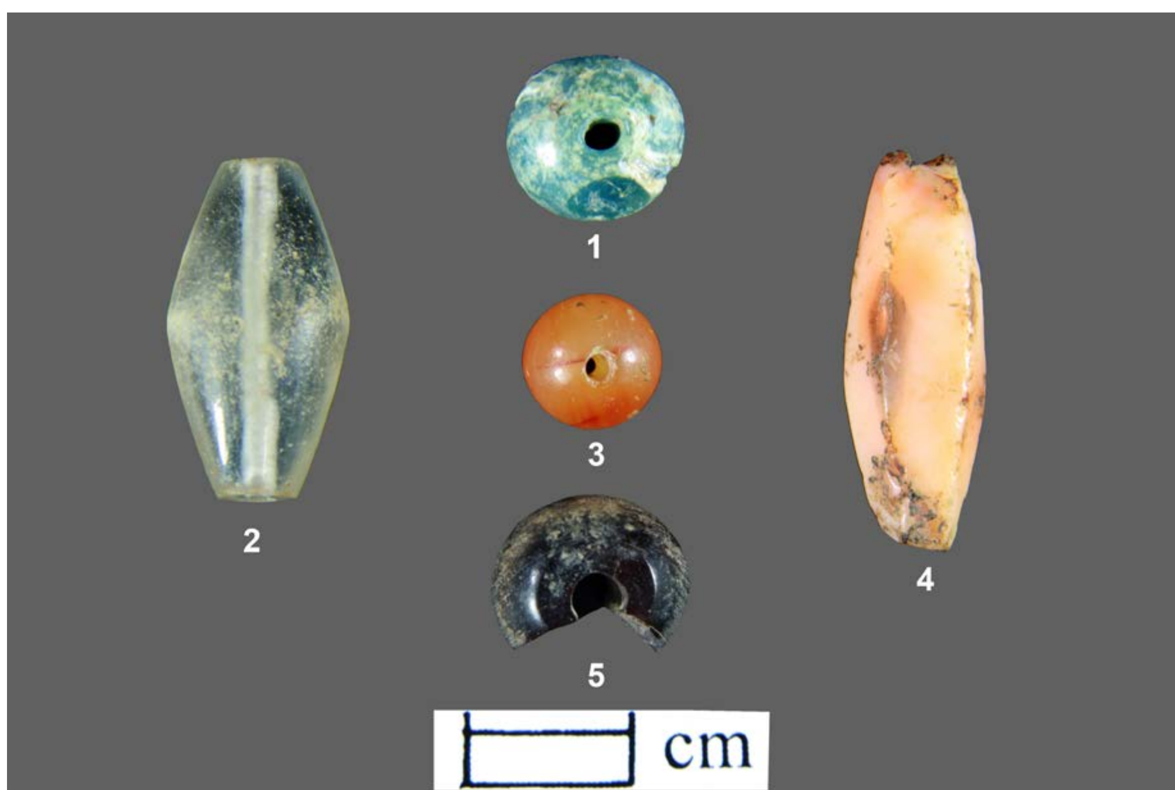
Pl. XIX. Terracotta and stone objects (Pd III)



Pl. XX. Stone and terracotta objects (Pd III)



Pl. XXI. Bone plaquettes (Pd III)



Pl. XXII. Beads (Pd III)

PERIOD IV

Among other finds of Period IV mention be made of terracotta objects like one human figurine, four animal figurines, one potter's dabber/anvil, two wheels, one ball, one rattle, one ear stud, eleven discs, twenty-one hopscotches, two discs, eight bangle fragments, sixteen beads, one agate bead and one stone pestle.

Listed below are the selected examples. The finds antiquities from unstratified deposit are classified on stylistic grounds.

Pl. XXIII

1. Terracotta human head with grotesque appearance. On thick medallion it is hand modelled in relief and the surface treated with red slip. Its wide eye sockets are filled with separate inlay while appliqué band with a central pendant and incised patterns is attached on fore-head as ornaments of which fragmentary traces only remain. A pellet as beauty spot is placed on fore-head between the raised brows. It may be used as an antefix. From an unstratified deposit (Reg. no. 811).

   Measurements: length 134.70 mm; width 109.90 mm; thickness 65.65 mm.

Pl. XXIV

1. Terracotta Naigamesi figurine, hands and legs are missing. It is fully hand modelled and devoid of surface treatment. Being modelled in slightly flattish manner this goat-headed figurine displays female elongated ears, figure tipped wide navel, bossoms in twin form, and lack of ornamentation. A perforated hole is noticed at the top for suspension. From an unstratified deposit (Reg. no. 857).

   Measurements: length 84.21 mm; width 56.17 mm; thickness 30.81 mm.

2. Terracotta plaque showing lower part of female figurine. Made of single press-mould it is devoid of surface treatment. One suave figurine seems to be standing in triple flexion pose leaving the whole body- thrust on right leg while the left hand rests on left thigh in relief. The schemetic drapery is being suspended above knee, and feet are ornamented with anklets. From a late level of Period III (Reg. no. 677).

   Measurements: length 70.67 mm; width 50.75 mm; maximum thickness 14.56 mm.

3. Terracotta plaque showing a male figurine lower part of which is missing. Made of single mould it is devoid of surface treatment and having black core in the section. Modelling lacks sharpness but renders hardly bearing to the figurine standing in steadiness with its arms resting on hip. Profuse ornaments like crown, ear-rings, necklace, bracelets, armlets and beaded girdle bedeck the figurine. A partly beaded string circling the body from right shoulder towards left

hip crosses the chest. The bejewelled figurine gives an impression of Bodhisattva at first glance. From an early level of Period III (Reg. no. 793).

Measurements: length 65.04 mm; width 39.23 mm; thickness 13.97 mm.

4. Terracotta plaque fragment illustrates a female torso. Made from single mould it is devoid of surface treatment. The well modelled figurine is standing with its globular breasts and wide hip bridged by slender waist keeping its two arms hanging straight. Regarding ornaments ear-rings, and beaded girdle on the waist is visible. From an unstratified deposit (Reg. no. 70).

   Measurements: length 49.25 mm; width 45.17 mm; maximum thickness 20.11 mm.

Pl. XXV

1. Terracotta fragment of a humped bull figurine, hand modelled and surface treated with slip. While eyes are shown by pierced pellets, nose and ears by pin-holes. Appliqué bands with rows of pin-holes are noticed around the horns and neck. A perforated hole at the jaw-end was probably used for pulling-string. From an unstratified deposit (Reg. no. 103).

   Measurements: length 68.05 mm; width 23.49 mm; thickness 77.40 mm.

2. Terracotta head of bird figurine, hand modelled and surface treated with slip. From an unstratified deposit (Reg. no. 567).

   Measurements: length 38.68 mm; width 24.95 mm; thickness 21.51 mm.

3. Terracotta head of a bird figurine, made of single mould and devoid of surface treatment. The perforated hole showing eyes was also used for pulling string. From an early level of Period IV (Reg. no. 269).

   Measurements: length 51.21 mm; width 19.63 mm; thickness 25.59 mm.

4. Terracotta animal figurine with mutilated head. It is hand modelled and devoid of surface treatment. From a late level of Period IV (Reg. no. 888).

   Measurements: length 59.43 mm; width 33.59 mm; thickness 39.73 mm.

Pl. XXVI

1. Terracotta gamesman, hand modelled and devoid of surface treatment. Three pin holes in a row are noticed on its top. From an unstratified deposit (Reg. no. 915).

   Measurements: height 30.04 mm; diameter 20.71 mm.

2. Terracotta ball, hand modelled and devoid of surface treatment. From a mid level of Period IV (Reg. no. 561).

   Measurements: diameter 20.47 mm.

3. Terracotta gamesman in horse shape, being hand modelled its surface is treated with lustrous black slip. From an unstratified deposit (Reg. no. 728).

   Measurement: length 44.51 mm.

4. Terracotta dice. Being cylindrical with square section it is hand modelled and devoid of surface treatment. One to four digits are shown on its four sides by means of central-dotted circlets like one circlet on first side, two on second and so on. From an unstratified deposit (Reg. no. 914).

   Measurements: length 48.02 mm; width 13.61 mm; thickness 12.47 mm.

5. Terracotta rattle, partly wheel-thrown necessary and partly hand modelled; surface treated with slip. From a late level of Period IV (Reg. no. 877).

   Measurements: height 59.39 mm; diameter 55.60 mm.

6. Terracotta rattle, hand modelled and surface treated with slip. The perforated hole at the top was used for suspension. From an unstratified deposit (Reg. no. 948).

   Measurements: length 37.85 mm; width 37.33 mm; thickness 20.55 mm.

7. Terracotta gamesman in bull form. Being solid casting from double mould it has a surface treated with wash. From an unstratified deposit (Reg. no. 659).

   Measurements: length 40.98 mm; width 19.32 mm; height 53.94 mm.

Pl. XXVII

1. Terracotta stamped design of a symbol showing stylized form of 'Tree in railing' commonly noticed in tribal coins. Surface treated with slip. From a mid level of Period IV (Reg. no. 610).

   Measurements: length 23.68 mm; width 15.49 mm; thickness 6.59 mm.

Pl. XXVIII

1. Terracotta short cone (areca-nut shaped) truncated bead, surface treated with wash. From a mid level of Period IV (Reg. no. 664).

   Measurements: height 19.12 mm; diameter 28.98 mm.

2. Variant of type-1. From a mid level of Period IV (Reg. no. 152).

   Measurements: height 13.36 mm; diameter 22.35 mm.

3. Terracotta barrel bead of black ware, devoid of surface treatment. From a mid level of Period IV (Reg. no. 626).

   Measurements: height 8.98 mm; diameter 11.15 mm.

4. Terracotta vase-shaped bead, devoid of surface treatment and bears grooved profile. From a mid level of Period IV (Reg. no. 407).

   Measurements: height 12.07 mm; diameter 21.70 mm.

5. Terracotta vase-shaped bead, surface treated with slip. From a mid level of Period IV (Reg. no. 7).

   Measurements: height 28.06 mm; diameter 27.42 mm.

6. Terracotta bangle fragment hand modelled with roughly circular section, and surface treated with wash. From a mid level of Period IV (Reg. no. 648).

   Measurement: diameter 49.97 mm.

7. Terracotta bangle fragment, hand modelled with plano-convex section, and surface treated with slip. From a mid level of Period IV (Reg. no. 634).

   Measurement: diameter 47.65 mm.

8. Variant of type-4. From a mid level of Period IV (Reg. no. 133).

   Measurements: height 12.09 mm; diameter 23.48 mm.

9. Terracotta ear-stud with concave sides, and surface treated with wash. Its both the faces are decorated with floral motif having eight diamond shaped petals. From a mid level of Period IV (Reg. no. 560).

   Measurements: height 15.74 mm; diameter 35.24 mm.

Pl. XXIX

1. Terracotta potter's anvil cum-dabber with central hole at the top, wheel turned, and surface treated with wash. A long stick is inserted at the top hole to use it as dabber inside any narrow mouthed pots. From a mid level of Period IV (Reg. no. 351).

   Measurements: height 33.22 mm; maximum diameter 45.14 mm.

2. Terracotta circular disc, surface treated with slip, and both the faces are decorated with circles of incised uprights. From a mid level of Period IV (Reg. no. 839).

   Measurements: height 14.99 mm; maximum diameter 43.24 mm.

3. Hopscotch made from red ware sherd. From a mid level of Period IV (Reg. no.1029).

   Measurements: diameter 23.48 mm; thickness 6.35 mm.

4. Terracotta single-hubbed spoke wheel. Made from single mould and surface treated with wash its moulded side displays spokes and hub. From a mid level of Period IV (Reg. no. 179).

   Measurements: diameter 48.93 mm; thickness with hub 19.87 mm.

5. Variant of type-2. Surface treated with wash, and both the faces are decorated with scallop pattern. From a mid level of Period IV (Reg. no. 324).

   Measurements: diameter 40.83 mm; thickness 13.32 mm

6. Variant of type-2. Surface treated with slip, and both the faces are decorated with notched triangles. From a mid level of Period IV (Reg. no. 137).

   Measurements: diameter 23.48 mm; thickness 14.08 mm.

7. Hopscotch made from grey ware sherd. From an early level of Period IV (Reg. no. 1028).

   Measurements: diameter 39.37 mm; thickness 6.36 mm.

8. Terracotta single bubbled wheel. Made of single mould it is devoid of surface treatment. Its moulded face is decorated with a circle of leavers hanging from central hub. From surface (Reg. no. 525).

   Measurements: maximum diameter 61.61 mm; thickness with hub 16.85 mm.

9. Terracotta boat-shaped toy cart-frame, hand modelled, and devoid of surface treatment. From an unstratified deposit (Reg. no. 969).

   Measurements: length 80.00 mm; width 46.64 mm; thickness 15.00 mm.

10. Fragment of stone pestle with convex barrel section. From a mid level of Period IV (Reg. no. 150).

    Measurements: length 58.66 mm; width 55.42 mm; thickness 36.62 mm.

Pl. XXX

1. Terracotta sealing. The Brahmi script. (Reg. no. 676).

   Measurements: length 34.50 mm; width 28.14 mm; height 32.62 mm.

Plates



Pl. XXIII. Terracotta human head (Pd IV)



Pl. XXIV. Terracotta figurines (Pd IV)



Pl. XXV. Terracotta animal figurines (Pd IV)



Pl. XXVI. Terracotta gamesman, ball, dice and rattle (Pd IV)



Pl. XXVII. Terracotta stamped design (Pd IV)



Pl. XXVIII. Terracotta objects (Pd IV)



Pl. XXIX. Terracotta objects (Pd IV)



Pl. XXX. Terracotta sealing (Pd IV)

PERIOD V

Among other objects Period V yielded a very few specimens like one terracotta, two beads, and one shell bangle.

The selected examples are listed below. Antiquities from unstratified deposit are classified on stylistic count.

List below are the selected finds from unstratified deposits.

Terracotta objects

Pl. XXXI

1. Gamesman of grey ware in human form. Of solid section it is decorated with hatchings. (Reg. no. 9).

   Measurements: length 38.97 mm; width 32.94 mm; maximum thickness 30.08 mm.

2. Net-sinker of red ware. Of flatish long barrel shapes it bears horizontal grove at one side (Reg. no. 163).

   Measurements: length 40.77 mm; width 25.24 mm; thickness 20.83 mm.

3. Gamesman of red ware having constructed hexagonal section. It is treated with wash (Reg. no. 565).

   Measurements: maximum diameter 26.20 mm; length 21.23 mm.

4. Circular disc in grey ware having solid cylindrical section. Its circumferences of both the sides are decorated with incised oblique strokes (Reg. no. 428).

   Measurements: diameter 33.88 mm; thickness 7.66 mm.

5. Circular disc in red ware having solid flat cylindrical section. It's both the sides are decorated with notched triangles forming circles (Reg. no. 830).

   Measurements: diameter 42.70 mm; thickness 17.67 mm.

6. Disc of red ware. Having flat cylindrical section it is decorated by incised oblique strokes on the circumference, and graffiti marks at the centre on both the sides (Reg. no. 144).

   Measurements: diameter 41.47 mm; thickness 15.53 mm.

7. Cone of unbaked clay. Of solid section it may be used as gamesman (Reg. no. 117).

   Measurements: diameter 30.11 mm; height 20.44 mm.

8. Gamesman of red ware. Being solid in section it is treated with slip, and bears an incised diagonal cross mark at the top (Reg. no. 673).

   Measurements: length 35.14 mm; diameter of the lower end 27.11 mm.

9. Gamesman of grey ware. Having two perforated hole at the centre. It is treated with slip (Reg. no. 1028).

   Measurements: diameter 29.74 mm; thickness 4.32 mm (maximum).

10. Ball of red ware. It is decorated with six blind pin holds in two rows, and surface treated with slip (Reg. no. 795).

    Measurements: diameter 36.43 mm.

11. Double hubbed wheel of red ware. Being handmade its spokes are shown on both the sides by incisions (Reg. no. 938).

    Measurements: diameter 51.23 mm; thickness with hub 22.40 mm.

12. Fragment of an animal figurine (probably a horse) in red ware. It's pinched out face, squatish legs display very crude modelling leaving the surface devoid of any treatment (Reg. no. 688).

    Measurements: length 69.39 mm; width 46.06 mm (maximum); height 65.78 mm.

13. Potters dabber cum-anvil of red ware having solid section and a 2.4 cm deep blind hole at the top. It is treated with slip and decorated with circlets of incised triangular notches at the top and on the shoulder. Generally used as anvil, a support to inside pot-wall while pedding from outside but to paddle inner side of narrow mouth deep pitcher or jar it is used as dabber inserting a long wooden handle at the top hole (Reg. no. 841).

    Measurements: diameter of the lower end 76.23 mm; diameter of the top end 57.11 mm; height 64.85 mm.

14. Dumb bell shaped object of red ware. It is devoid of surface treatment and may be used as weavers thread spool (Reg. no. 849).

    Measurements: diameter 45.74 mm; length 66.32 mm.

15. Flying bird figurine of red ware having prominent eyes of appliqué band round the neck bearing incised oblique design (Reg. no. 93).

    Measurements: length 90.78 mm; width 67.55 mm; thickness 37.36 mm.

16. Potter's stamp in red ware bears quaterfoil pattern with central dot (Reg. no. 164).

    Measurements: length 60.70 mm.

Bone objects

Pl. XXXII

1. Bone implement, having uniformly polished surface. Its pointed end seems to have been charred (Reg. no. 613).

   Measurements: length 66.44 mm; width 18.23 mm; thickness 8.71 mm.

2. Bone lower part of butted stylus showing uniformly polished surface (Reg. no. 608).

   Measurements: diameter 7.09 mm; length 68.04 mm.

3. Bone lower part of antimony rod, showing uniformly polished surface which has carved decorated end (Reg. no. 890).

   Measurements: length 93.85 mm; diameter 6.06 mm.

4. Bone implement, having uniformly polished surface (Reg. no. 715).

   Measurements: length 96.01 mm; width 18.58 mm; thickness 7.31 mm.

5. Bone stylus, having ball-pointed working edge and polished surface (Reg. no. 982).

   Measurements: diameter 26.20 mm; length 21.23 mm.

6. Bone, implement, having polished surface (Reg. no. 536).

Pl. XXXIII

1. Agate, banded ring stone, barrel shaped having elliptical section (Reg. no. 835).
2. Agate, banded short truncated convex bicone square (Reg. no. 943).
3. Agate, banded long barrel having elliptical section (Reg. no. 861).
4. Agate, black, tubular (Reg. no. 189).
5. Agate, banded, long barrel having circular section (Reg. no. 741).
6. Agate, banded; long barrel having circular section (Reg. no. 908).
7. Standard barrel shaped Coral having circular section (Reg. no. 936).
8. Long barrel shaped coral of circular section (Reg. no. 870).

9. Long barrel shaped lapis lazuli of circular section (Reg. no. 921).

10. Jasper, dark green, double pentagon (Reg. no. 141).

11. Long barrel shaped topaz having circular section (Reg. no. 99).

12. Paste, gold gilded: gadrooned (Reg. no. 364).

13. Standard barrel shaped carnelian of circular section (Reg. no.963).

14. Carnelian, etched: long barrel having circular section. Etched patterns show intersecting oblique lines forming diamond and triangle enclosed by horizontal bands two in each side (Reg. no. 530).

15. Carnelian: short truncated convex bi-cone square (Reg. no. 796).

16. Glass, bi-colour of black and white: cylindrical of lenticular section (Reg. no. 378).

17. Glass, bi-colour of white and dark brown showing eye pattern: barrel having plano-convex section (Reg. no. 768).

18. Glass, bicolour of white and brown: long cylindrical having circular section (Reg. no. 262).

19. Glass, bicolour of black and white forming spiral pattern ellipsoid (Reg. no. 51).

20. Glass, black with white bands: long barrel having circular section (Reg. no. 945).

21. Agate, banded: long barrel of circular section, finished but unbored (Reg. no. 584).

Plates



Pl. XXXI. Terracotta objects (Pd V)



Pl. XXXII. Bone implements (Pd V)



Pl. XXXIII. Stone and glass beads (Pd V)

COPPER OBJECTS

The advent of metal has been a remarkable breakthrough in human's technological development. Metal has distinct advantage over stone, bone or wood for making implements. Metal is tougher susceptible of finer edge and more durable. New forms and types of tools, even modifications of older ones, were possible due to its malleability and fusibility.

The copper has to be alloyed for better fusibility for complicated casting. Alloying is resorted to for improving the ductility and hardness of metal. Arsenic, Tin and Nickel have been used to alloy copper. Tin has been employed optimum range from 8% to 12%.

Total 73 copper artifacts were reported from the excavations. Stratigraphical, numerical and equipment occurrence of these objects is shown in Table 1.

Object / Periods	Fish Hook	Copper Knife	Humped Bull	Ring	Borer	Antimony Rod	Bangle	Needle	Amulet	Bead	Pendant	Chisel	Nail / Latch	Total
Harappan	-	1	-	6	-	-	4	2	1	-	-	-	2	16
PGW	-	-	-	-	2	-	-	-	-	-	-	-	-	02
NBPW	-	-	1	-	1	3	-	-	-	3	-	1	1	10
Sunga	1	-	-	-	-	-	-	-	-	-	-	-	-	01
Gupta	-	-	-	-	-	-	-	-	-	-	1	-	-	01
Total														30

Selected specimens are described below:-

Pl. XXXIV

1. Copper bangle, circular in section. From Period I (Reg. no. 119).

2. Copper bangle, squarish in section. From mid level of Period I (Reg. no. 1869).

3. Fragment of copper bangle, circular in section. From Period I (Reg. no. 1762).

Pl. XXXV

1. Copper ring, circular in section with spiral form. From Period I (Reg. no. 29).
2. Copper ring having five coils, made of single wire, rectangular in section. From Period I (Reg. no. 573).
3. Copper ring rectangular in section with open ends. From Period I (Reg. no. 1901).
4. Amulet made with thin wire, having roundish section in spiral form. From Period I (Reg. no. 901).
5. Copper ring rectangular in section with open end. From mid level of Period I (Reg. no. 1479).
6. Copper ring rectangular in section with open end. From mid level of Period I. (Reg. no. 1395).
7. Copper ring circular in section. From mid level of Period I. (Reg. no. 1818).

Pl. XXXVI

1. Antimony rod of round section thickened at the end. From Period III (Reg. no. 952).
2. Antimony Rod of round section thickened at the end. From Period III (Reg. no. 197).
3. Borer of round section. From Period III (Reg. no. 447).
4. Chisel: Chisel of round section flattened at the working end. From Period III (Reg. no. 1807).

Pl. XXXVII

1. Copper bead, cylindrical circular shaped. From Period III. (Reg. no. 1822).
2. Copper bead standard faceted hexagonal shaped. From Period III (Reg. no. 1677).

Pl. XXXVIII

1. Decorated knob of bronze showing a pair of humped bulls resting on rectangular platform. The ears of both bulls are joined with each other. Hump, ears and horn are prominent. Faces of both bulls are blunt. The legs and tails of bulls are comparatively long in proportion to body. The lower portion having a faceted hollow hexagon and round shaft of which lower part is broken. The shaft and platform is attached with round section rod. The shaft was probably standing on the circular base. From Period III (Reg. no. 496).

2. Pendant, thin lozenge shaped pendant having some motif on obverse and reverse is plain with a ring hold/ring top made on squarish thin sheet of brass. From unstratified level of Period V. (Reg. no. 1574).

Pl. XXXIX

1. Borer of squarish section. From Period II (Reg. no. 292).
2. Copper needle with circular eye. From Period I (Reg. no. 1870).
3. Copper needle with circular eye. From Period I (Reg. no. 1978).
4. Hooked pin or fish hook of squarish section and flattened at other end. From Period IV (Reg. no. 818).
5. Antimony rod or nail – porer of round section flattened at one end. From Period III (Reg. no. 678).
6. Object of indeterminate use (probably a latch) of round section flattened at one end and pointed at other end. From Period I (Reg. no. 965).

Not Illustrated

1. Borer of round section. From Period II (Reg. no. 69).
2. Borer of square section (possibly a long chisel) with a flattened lower end. From Period II (Reg. no. 737).
3. Copper bead standard pear shape. From level of Period III (Reg. no. 488).
4. May be fragment of copper nail having round section. From upper level of Period I (Reg. no. 1541).
5. Fragment of copper bangle with rectangular section. From Period I (Reg. no. 1893).
6. Copper knife, edge of thin section. From Period I (Reg. no. 1849).

Plates



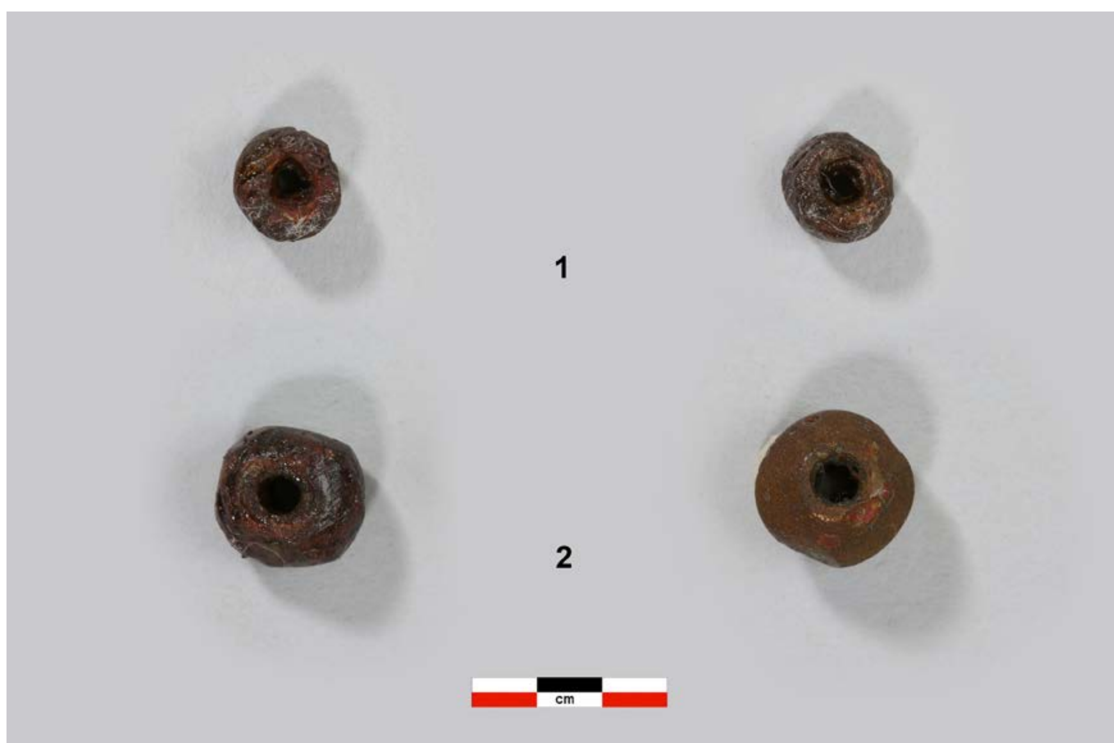
Pl. XXXIV. Copper bangles (Pd I)



Pl. XXXV. Copper rings (Pd I)



Pl. XXXVI. Copper chisels (Pd III)



Pl. XXXVII. Copper objects (Pd III)



Pl. XXXVIII. Copper objects 1. Decorated knob (Pd III) 2. Pendant (Pd V)



Pl. XXXIX. Copper objects

IRON OBJECTS

The iron was used as the principal metal for tools and weapons in the PGW period. It gave fresh impetus to and accelerated the pace for development in practically every walk of life. The advantages of this metal were manifold; the iron ores were far more readily available than copper ores and because of its utility, iron seldom needed deep mining. This new metal has definite advantages over copper and bronze in as much as it was cheaper to produce than bronze and it had more tensile properties.

India has richest deposits of iron both in quality as well as in quantity. The main iron ores are (i) magnetite (ii) hematite (iii) limonite (iv) siderite (v) iron pyrites (vi) siderite (v) iron purities (vi) pyrrohotite.

Due to an early acquaintance of man with hematite and magnetite as also an account of their abundance, it is quite likely that these two ores of iron were used by the early iron smelters for production of iron.

Iron casting requires very high temperature to melt iron (154°c). Iron object had to be forged stage by stage from a bloom to a bar and then thinning, pointing, folding and forge welding.

Archaeological investigations carried out during the last few decades have yielded valuable information at about the earliest iron-using communities – some of the principal sites are Hastinapura, Ahichchhatra, Atranjikhera, Alamgirpur, Allahpur, Khalana, Kausambi, Rajghat, Prahladpur, Chirand, Ahar, Noh and Hulas.

Forty four iron objects were recovered from different strata of Hulas.

Pl. XL

1. Nail of square section with squarish head (Reg. no. 772).
2. Hook/Nail of square section with flat hook head (Reg. no. 923).
3. Spear head, tanged with flattered section (Reg. no. 20).
4. Spear head with flattered section (Reg. no. 23).
5. Nicely shaped plumb-bob with flat top and rounded body partially broken and partly corroded (Reg. no. 314).

Pl. XLI

1. Featureless and thickened head, tapered to a point working and almost squarish cross section. This could be used as a marking nail (Reg. no. 832).

2. Knives convex blade with slightly up-turned tip, triangular corss section (Reg. no. 21).

3. Knives straight blade with rounded tip; from tip to the end is folded presumably for fixing a wooden handle (Reg. no. 34).

4. Spear head: triangular elongated blade with an uneven surface; sides gradually taper to an angular point squarely at shoulders, biconvex cross section (Reg. no.750).

5. Clamp: Right angled bent clamp with thick short and truncated sides (Reg. no. 18).

6. Roughly round headed nail, corded, circular section blunt end (Reg. no. 35).

Plates



Pl. XL. Iron objects



Pl. XLI. Iron objects

CHAPTER VI

Disposal of Dead

The Harappan Civilization is well-known for its cemeteries like R-37, at Harappa, Lothal and Kalibangan. The cemeteries found at Ropar and Chandigarh, slightly away from the habitational areas were of smaller dimensions. These burials revealed typical funerary pots and personal ornaments. The evidence of burials, both ordinary and crematory was also noticed along with pots at Dher Majra but details are missing. At Bhagwanpura, two skeletons lying in north-south orientation with heads towards the north were found from the habitational area of sub-period IB. There is no funerary good in the graves.

The cemetery at Ropar is disturbed by later occupations. The grave-pits which vary in dimensions, revealed that vessels were placed on the same levels as the body. From the burial, pots ranging from 2 to 26 numbers were noticed. In one of the skeletons, a faience bangle was still on the left wrist of wearer, whereas in another a copper ring on the middle finger of the right hand was noticed. At Chandigarh, nine skeletons duly provided with the grave goods which include a variety of pots, personal ornaments and a terracotta toy-cart wheel, were noticed. Except one, all the skeletons were found in north-south orientation in extended articulate position resting on the back, and head towards the north. All the skeletons were found in one row. In one pit, two skeletons were placed just side by side and were provided with common grave goods. The ninth skeleton was just opposite to this row of the burials. The body was placed on the right side and the head was pointing towards the south (Lalman 1971).

The presence of skeletons without funerary objects at Bhagwanpura in habitational area gives rise to new theories. At Ropar and Chandigarh diagnostic Harappan traits survived and so was the custom of separate cemetery away from habitational area. It appears at Bhagwanpura IB Harappans were supplanted by local cultures and diluted to the point of non-existence. If classical Harappan would have been there, the local folk would not have allowed to break the established convention or to bury their dead inside the house, a practice which was never followed by them. If the position of these skeletons is accepted then the question arises – were these people of (Bhagwanpura IB) Harappan stock or something else because this change must have occurred due to radically different cultural values. Even the PGW people never buried their dead in the habitational area.

At Farmana, all the burials have a rectangular pit lined with clay. The body was placed inside the pit in north-south orientation with head towards the north. Three types of burial customs namely primary, secondary and symbolic were in vogue. The burial goods have pots and jewellery including beads, bangles, ear-rings etc.

Moreover, Sanauli in western Uttar Pradesh has one of the biggest necropolis known so far in Indo-Pak sub-continent as at Farmana. It has double burials, triple burials, and symbolic burials including a burial with steatite inlay pieces, burial with human skull and a gold object and child burial (Sharma *et. al.* 2006). At Sanauli some ritualistic objects of copper were found within a brick structure composed of large size bricks having their length 51 to 53 cm. *Satapatha Brahmana* mentions the size of bricks of the Chiti, the largest ones being the length of thigh bone which should be around 52 cm as found in the pre-Mauryan bricks from various places including Lauriya Nandangarh, Rajgir and in more recent times at Sanauli.

The *Rigveda* also refers to burial customs namely cremation (*agni-dagdha*) and burial (*anagni-dagdha*) and both these are present in the Late Harappan burial practices. The symbolic burial was very common with Harappans whether in north India or Gujarat. In the excavations at Nagwada, symbolic burials were also noticed.

During the excavations at Hulas, a row of pots was noticed on the periphery of a pit. The identification of these pots could not be done till the excavations at Sanauli (Sharma *et al.* 2006) revealed similar rows of miniature pots near burials. These symbolic burials were also noticed even at the Harappan site viz. Nagwada in north Gujarat (Sonawane 2011: 19-42) (**Pl. Ia, b and c**). The interpretation of these miniature pots in a row may be connected with burials in one or other form. When a person dies outside, then such rituals are performed by his relatives at his place.

Mention of the modes of disposal of dead in ancient India is found in Vedic literature. Certain hymns in *Atharvaveda* describe rituals pertaining to burials (Mani 2006-07: 165). The *Pitrimedha Sukta* of *Atharvaveda* suggests that besides cremation, other types of burial rites which were prevalent in the society included putting the dead body on higher open air place (on tree or hill) or relocating the same. The dead ancestors have been evoked in the verse:

Ye nikhara ye paropta ye dagdha ye chodhitah

Sarvanstanagna a vaha pitrin havishe attave

Atharvaveda (18.2.34)

Plates



Pl. Ia. Evidences of symbolic burials, Hulas, U.P.



Pl. Ib. Evidences of symbolic burials, Sanauli, U.P.



Pl. Ic. Evidences of symbolic burials, Nagwada, Gujarat

CHAPTER VII

Chronology

Since the excavations at Alamgirpur in 1958, the earliest culture in Gangetic *doab* was identified as Harappan, whereas Hastinapura provided a red ware industry at the bottom known as the Ochre Coloured Ware (hereafter OCW) (Lal 1954-55). In due course the excavations at Atranjikhera (Gaur 1969: 112-117) revealed a flimsy deposit consisting of black slipped and black-and-red wares between the OCW and PGW. At Jakhera also a pre-PGW phase of black slipped and black-and-red wares was noticed, whereas at Allahapur, Alamgirpur and Khalua, it showed a preponderance of black-and-red ware and black slipped ware in the early levels of PGW and then ceased altogether. This phase was also confirmed outside the *doab*, at Noh and Jodhpura in eastern Rajasthan.

The relative chronology of the Harappan culture built primarily on the stratigraphic and typological sequences provide the following order of four different chronological stages in Punjab, Haryana and western Uttar Pradesh (Dikshit 1977, 2011). The stage of Early Harappans encountered at Kalibangan, Banawali, Balu and Rakhigarhi has not been taken into account.

1. Early Mature Harappan - Banawali, Balu, Kotla Nihang Khan and Ropar I

2. Late Mature Harappan - Ropar, Sanghol IA, Chandigarh, Bara, Dher Majra, Mitathal IIA, Mirzapur, Alamgirpur and Hulas I

3. Late Harappan – Mitathal IIB, Sanghol IB and Bargaon

4. Degenerate Harappa – Bhagwanpur IA and Dadheri IA

5. Overlap (Degenerate Harappa – PGW) Bhagwanpura IB, Dadheri IB, Sanghol IC, Nagar I and Katpalon I

The chronological history as revealed at Hulas is in no way different from Ropar (1952) and Rohira (1980-81) in Punjab, Daulatpur in Haryana (1972) and Alamgirpur in Uttar Pradesh (1958) and is the repeat of the same order. The Harappan habitation at Hulas is located on the southern side of the present mound, whereas Painted Grey Ware

users settled on the northern side and in the long run during the periods of NBPW and Sunga-Kushan, because of the expansion of population and movement from northern to southern side, the area between the two mounds was narrowed down and in long run during Gupta and medieval periods, the two mounds became one. However, the southern part which was under Harappan occupation remained unoccupied by the later cultures.

From the stages of relative chronology, Harappans and Painted Grey Ware cultures were found overlapping by J.P. Joshi at Dadheri, Nagar and Katpalon in Punjab and also at Bhagwanpura in Haryana. But just near Bhagwanpura at Daulatpur no such overlapping was found. Bisht (1976) also did not noticed any overlap at Sanghol but later on G. B. Sharma (1982) reported overlap which appears to be a localized survival of Late Harappans.

In the overlap deposit of Bhagwanpura IB, a broken bone stylized human shaped pendent decorated with circlets and incision has been reported (Joshi 1993, Fig. 38: 22, Pl. XXXIX, see page 134). The identical copies of the same, at least three bone figurines (complete and broken) were also reported from NBPW deposit at Hulas (Pl. XXI).

The excavations at Bhagwanpura revealed that the habitational area was subject to frequent floods even in the lowest period, it was found that the habitation was built over mud platforms evidently to save it from the fury of floods. The end or the overlap phase is also capped by floods. Rao thinks that 'the frequency of floods in Bhagwanpura may be one of the reasons why the Late Harappan wares and Painted Grey Ware got mixed up in deposit. It is desirable to clear the doubt whether the so-called interlocking is read in the cultural sense or accidental due to disturbances of layers'. The evidence from Dadheri, Nagar, Katpalon and Sanghol, according to Rao (1979) is not reliable as the pottery assemblage of the Late Harappan phase may have been water logged and re-deposited. But the excavators do not have such doubts.

The presence of skeletons without funerary objects at Bhagwanpura in the habitational area gives rise to new theories. At Ropar and Chandigarh cemeteries (Lalman 1971) diagnostic Harappan traits survived, so also the custom of a separate cemetery away from habitational area. So was the case at Farmana which revealed seventy burials in a separate cemetery. The excavations at Sanauli in western Uttar Pradesh also confirm a practice of separate cemetery in Late Harappan context where even copper hoard objects were found in situ. It is one of the biggest cemeteries known so far where at least 116 graves were brought to light (Sharma *et. al.* 2006).

The recent excavations at Muhammad Nagar in Gurgaon District (1997-98) and Karsola Kheda in Jind District, the users of PGW levelled the site (layer 2) and continued to live there for sometime (Shinde and Sengar 2011). At Bhorgarh in Delhi, the Period I was identified as Late Harappans which was succeeded by PGW suggesting that people were living in circular huts supported by wooden posts. There was no cultural overlap (Babu 1994-95: 88-90).

The late phase of Harappan Culture is not having sufficient available radio-carbon dates for arriving at any definite chronological interpretations. Bara and Sanghol have provided a set of dates, but the chronological position of Bara is still a debatable issue. The four radiocarbon dates of Bara range in time-bracket from 1890 ± 95 to 1645 ± 90 BCE. Bara revealed 14 layers and the earliest date is from the middle level-9, at a depth of 2.20 m below surface, thereby suggesting that this site must have been occupied by the beginning of the 2nd millennium BCE. From Sanghol, there are five dates from two trenches. In one of the trench, the dates range from 1900 ± 220 to 1490 ± 130 BCE and in other one from 1730 ± 220 to 1700 ± 210 BCE. All these samples are from a depth of 3.4 to 5.4 m below surface. These dates from Bara and Sanghol, show the relative contemporaneity of the Bara and Sanghol occupations in Punjab.

Recently 18 samples of pottery from Bhagwanpura were subjected to thermo-luminescence dating by Bhabha Atomic Research Centre, Bombay, the Late Harappan sherds occur exclusively in all layers beyond 1.30 m depth. There are 7 dates from the depth of 1.30 to 2.40 m out of which three TL ages, according to the report, do not conform to the general trend. Other estimation provided a time-bracket between c. 21163 and 1046 BCE and average error of 15%. Four TL dates also came from Sanghol and range in time-bracket from 2060 ± 375 to 1325 ± 330 BCE. The average time-bracket appears to be from c. 2100 to 1300 BCE. The time-bracket based on radiocarbon dates is somewhat shorter and precise. TL and C-14 measurements from Bara, Sanghol and Bhagwanpura have provided a time-bracket which requires further confirmation by way of more samples for dating purpose.

The C-14 dates from Hulas range from 2560 ± 155 and 2005 ± 115 (uncalibrated date of BCE) and are on earlier side. The date from Mitathal is also 2370± 220 BCE. This seems to be early in comparison with Bara and Sanghol dates. In my opinion there is no consensus on the dates based on C-14 till the differentiation between Mature Harappan and Late Harappan clears, and the concept of Late Harappans is better defined or understood. Geologists have suggested that somewhere in 2000/1900 BCE,

due to some tectonic movements in upper Himalayas, the Yamuna started flowing as a separate river and most of the earlier tributaries of Sarasvati started flowing into the Yamuna. If this date is acceptable, then most of the sites in western Uttar Pradesh could be equated in a time bracket before 2000 BCE and they might have continued in later centuries till they came in contact with local cultures.

But in the Upper *doab* specially in the District of Saharanpur, Harappan sites were occupied by the PGW users possibly at a much later date when black slipped and black-and-red wares ceased to function with them. Moreover, the areas of Saharanpur and whole of adjoining Haryana and Punjab were not in the diffusionary zone of black-and-red wares and that may be the reasoning of their absence from the early levels of the PGW culture from this region above the district of Meerut. The availability of a few sherds of black slipped and black-and-red ware sometimes from PGW complex in this region may be due to accidental firing.

The excavation confirmed the chronology of the Painted Grey Ware, as noticed earlier at Hastinapur as an independent period after Ahichchhatra and the time period ascribed as the beginning of 1st millennium BCE may be followed (*circa* 1100-800 BCE). The PGW people continued to use this deluxe pottery even in the beginning of the NBPW times, till they were phased out by latter.

In the PGW period an archaic terracotta human figurine has been found which further confirm that the tradition of producing archaic terracotta figurine is much earlier as supposed by many scholars. In the excavations at Jakhera by M.D.N. Sahi such terracotta figurines much advanced in its archaic form was also noticed (Sahi 1994: 139-152, Pl. XVII). In the NBPW period, the presence of three bone figurines clearly establishes that this kind of production cannot be achieved unless it has a long artistic tradition.

The periods of Sunga-Kushan and also Gupta followed without any break. There was however scant occupation during the medieval period.

CHAPTER VIII

Discussion: The Analysis of Field Data

By analysing the field data of Hulas excavation, it was noticed that in the Gangetic *doab* the Harappan complex at Hulas, Alamgirpur and Bargaon was found more influenced by the material remains of Sutlej Valley. Extensive or large sites are absent in this region. Only medium and small sized sites are present. The numbers of sites noticed were more than seventy-five. In size they are not more than 200 m in length and 150 m in width, on the average suggesting that habitations belong to a small cluster of families. Whether these sites suggest a linear planning or a nucleate one as worked out by Chitalwala in Saurashtra is difficult to say (Chitalwala 1979: 113-21). However, one can notice at present linear settlements along the Surhi Jamuna and circular pattern of settlements in Solani-Ratmau divide (Singh 1971: 143). Most of these sites are located along the edge of the alluvial strips flanking the tributaries of Yamuna but not on Yamuna proper. These are relatively on higher grounds ensuring safety against the recurring floods. These settlements generally follow the drainage lines and the nature and degree of slope. In the districts of Muzaffarnagar and Meerut, these sites are uniformly spaced at a distance of 8 to 12 km but in Saharanpur area, the distance is between 5 and 8 km. The construction of mud platforms, as a conceptual architectural feature of Harappans, was also noticed in the excavations at Hulas and also in exploration at Jasala (District Muzaffarnagar). Hulas revealed a terracotta sealing bearing three Harappan letters, whereas at Alamgirpur only graffiti marks were noticed on a trough. One can notice pure-Harappan sites and also sites mixed up with Ochre Coloured Ware (OCW) in the Yamuna valley of district Saharanpur. The Harappan Civilization has completely lost its identity and individuality at Ambkheri, a degenerated Harappan site in Ganga valley. This site revealed typologically late Harappan pot-forms, terracotta cakes, beads, cart-wheels and animal figurines including humped bull and carnelian bead. Chronologically the cultural traits of this site conform to Bhagwanpura IA where terracotta cake is a rare item.

Alamgirpur in its occupational deposit of 1.80 m had preserved some advance cultural traits like script, typical Indus goblet and perforated jar. However, Hulas also yielded a terracotta sealing, structures of burnt-bricks with finger marks and mud-brick structures. Indirect evidence of hut-dwellings in the form of wooden posts with mud (*daub*) plaster over them was also found. The sizes of rooms and of hutments suggest that structures were too small to house big families. Moreover burnt brick was not

commonly used during this phase of Harappans. An indeterminate object of baked clay, looking like a brick with two curved ends, having gap in the middle, noticed at Hulas was also found at Bara, Chandigarh, Sanghol, Bhagwanpura and Bargaon. At least seven different pieces of this object in various sizes were found at Hulas. The site of Hulas including successive cultures measured 330 x 172 m in length and breadth (5.67 hectares). The Harappan habitation may be around 3.00 hectares.

Alamgirpur and a recently explored site Banti-Khera on Krishni, tributary of Yamuna, appears to be the earliest but coeval with Hulas in this region. The excavations at Alamgirpur revealed patches of reed impressed burnt clay, an indirect evidence of hut-dwellings, remains of mud-walls, and kiln-burnt bricks of two sizes (30 x 15 x 7 and 35 x 20 x 10 cm) one of them conforming to Harappan Civilization. A few of the bricks bear frogging of three finger marks either along the length or diagonally at the corner, also noticed at Sanghol, Bhagwanpura and Hulas. Antiquities of terracotta, faience, steatite, semi-precious stone, bone, copper or bronze, graffiti marks on trough and evidence of cloth were also recorded.

At Bargaon in a 1.20 m thick occupational deposit the Harappan shapes including Indus goblet, ring-stand and miniature pedestalled-cups were encountered (Deshpande 1965). Important antiquities were fragmentary copper celt and rings, a chert blade and weight piece, a pot with animal-headed handle having a perforation in the middle, terracotta and faience bangles, cart-wheel with central hub, and terracotta cakes round and oblong. No evidence of structure was found. In the adjoining Haryana at Bhagwanpura, the burnt-bricks are not in the ratio of 4:2:1 and steatite paste is also absent. It appears that Hindon-Krishni complex of *doab*, noticed at Alamgirpur and Bargaon is an extension of Sutlej complex and may be later than the upper levels of Ropar, since quite a few of the Harappan characteristics show a degeneration or absence in this region.

The Period I at Hulas represented by 2.40 m thick deposit yielded Harappan red ware, besides the associated non-Harappan red and thick grey wares. Other finds included terracotta beads, bangles, animal figurines, toy cart-wheels with raised central hub and terracotta sealing, faience beads and bangles, agate and carnelian beads, copper bangles, bone point and stone querns and pestles. The oval shaped terracotta cakes with pointed ends and round variety were found. A terracotta sealing comprising three Harappan signs was noticed (Mahadevan 1982: 117). Fragmentary kiln-burnt bricks with husks as degraissant were found inside an oval shaped hearth having a constricted mouth. Mud-floorings with burnt patches and pit-activities were also

encountered. In order to keep their settlement intact, in due course, a solid mud-platform running in north-east and south-west direction was raised as a protective measure against the floods. In the centre of the mound is a rain gulley or ditch separating the Harappan settlement from that of the Painted Grey Wares. The Harappan pottery reported from the ditch look like the Ochre Coloured Ware of this region. This complex might have some connection with Sarasvati valley in the matter of pottery forms (including absence of beakers and perforated jars and presence of solid mud platform). In general, the incised pottery of Bara found with Harappans in Sutlej complex is rare at this site (Dikshit 1981: 70-76).

The Haryana Harappans have closely connected networks of towns and villages around them but in Punjab and western Uttar Pradesh in the absence of large settlements, the situation cannot be viewed in urban network. As already pointed out, environmental and economic factors are very important in determining the form of the settlement pattern including the emergence of urban centres. The settlement pattern of central Indus valley of twin mounds – citadel area and Lower town is absent in Sutlej and Yamuna, whereas in Sarasvati and Drishadwati river valleys, this pattern continued. Assuming that economic development in *doab* was quite restricted, as appears from the cultural items found in excavations in this region, the absence of large Harappan settlements is self-explanatory. The structure of any settlement pattern indicates the type of economy prevailing in the settlement. The layout of Harappan settlement changes and quality of the structures demonstrate a process of gradual degeneration and decay.

The Harappan civilization did not die a sudden death with the destruction of towns in the Central Indus valley and Rajasthan, but survived for many centuries outside the Indus valley in Gujarat, North Deccan, Malwa, Haryana, Punjab and western Uttar Pradesh. In Gujarat Late Harappans established their settlements near the sources of raw material; so too in northern India. At Sanghol and Dher Majra, the major industry was the production of beads in different materials including gold, whereas in Haryana the late Harappan thrust was to sought possibly for exploitation of copper from Khetri or other adjoining areas and transporting them to other contemporary urban centres. This also gives an idea that the exploitation of traditional mines used by classical Harappans remained no more a lucrative proposition for them, partly because of the deteriorating economic condition in Indus valley and partly due to longer distances.

CHAPTER IX

Comparison and Conclusion

The geographical horizon of Harappan civilization extended even upto the Ganga-Yamuna *doab* on the east and to Gujarat and Maharashtra in the south-easterly direction. The end was not abrupt as thought earlier, but like its genesis it is still a vexed issue. The cultural gamut of the nuclear region of Harappan civilization when examined internally revealed regional variations similar to devolutionary tendencies specially in the peripheral region of northern India comprising the states of Jammu and Kashmir, Punjab, Haryana and Western Uttar Pradesh and in the south upto northern Maharashtra (Daimabad). This was further confirmed by well-planned regional surveys and horizontal excavations. In Gujarat, this civilization developed and transformed into other local cultures but in north India, it was only a devolutionary process on the pattern of urban and rural relationship in settlement pattern. In western Uttar Pradesh most of the settlements are rural and as such the decline of urban settlement and internal regional trade relations further worsen the socio-economic conditions of the people.

The mature phase which degenerated into a well defined late phase requires to be spelt out clearly. How it came in contact with new regional elements and how a complete metamorphosis took place are problems requiring fresh appraisal. The characteristic aspects requiring detailed interpretation include the change in pottery forms, settlement pattern, metal technology, minor works of art, trade contact and disposal of dead. The socio-economic and religio-political pattern of Harappan settlements, the chronology, origin and end, the message of its script and the relationship with contemporary civilizations outside India are not fully understood and are yet to be placed on a proper footing.

A survey of some of the excavated sites and other field data in north India, viz., Manda in Jammu and Kashmir, Kotla Nihang Khan, Ropar, Chandigarh, Bara, Dher Majra, Sanghol, Katpalon, Nagar and Dadheri in Punjab, Mitathal, Banawali, Balu, Mirzapur, Daulatpur and Bhagwanpura in Haryana and Alamgirpur, Bargaon and Hulas in Uttar Pradesh, have provided sufficient material for understanding the settlement pattern and other social and cultural aspects including the chronological frame work of Harappan vis-à-vis late Harappan cultures. In north India the migration took place along the river system but in Gujarat it was also possibly along the coastal belt. The expansion of Harappan settlements in northern India depended upon the nature of the

soil and easy availability of water for irrigation and domestic use. The annual floods also helped in irrigation and this may be the reason that even the banks of the smallest streams in Punjab, Haryana and western Uttar Pradesh were directly occupied. The migratory pressures of Harappans to Gujarat and further south and to Punjab, Haryana and western Uttar Pradesh appears to be not only for agricultural produce but were possibly coupled with some other needs such as exploitation of natural resources such as marine gastropod and semi precious stones from Gujarat, timber from the forest hills of Himalayas, copper from Khetri area of Rajasthan and more clayey alluvial plains for the cultivating of cotton. The Babylonian and Greek names for cotton, *Sindhu* and *Hindon* respectively point to the Indus valley as the home of cotton (Randhawa 1980: 179).

In Pakistan the southern Indus valley presented a different picture with the Jhukar related materials known to us from half a dozen sites. The renewed excavations at Jhukar provided evidence to substantiate the theory that the so-called Jhukar was in fact, a representative of the late decadent Harappan civilization and did not belong to a different class of people as thought earlier (Mughal 1982: 85). At Amri IIIC a transformation was noticed in Harappan pottery. The pot-forms with thicker and more stylized decoration termed as fore-runners of the Jhukar were continued in next phase (Casal 1964: 88-89). Cemetery H people succeeded the Harappans at Harappa and the number of sites in old Bahawalpur region. At Mohenjo-daro in the upper levels, a late squatter type of occupation was noticed (Dales 1966: 93-98). The most significant features of the late Harappan period in the upper and lower Indus valley is the cultural continuity from the mature Harappan to the late Harappan (Cemetery H and Jhukar related) materials. There is no precipitate break but a marked change in the so far undefined social organizational structure of the Harappan society is reflected in their material magnification during the late Harappan period in the second millennium BCE (Mughal 1983: Personal Communication). For these seemingly post-Harappan cultures, the term late Harappan is being increasingly used, suggesting perhaps that Harappan tradition continued both in Jhukar and Cemetery H. There is a fresh need to work out the relationship between the urban Harappan settlements and the neighbouring rural areas.

Outside the limits of Indo-Pakistan sub-continent, Mundigak in Afghanistan gives a chronological sequence of Indus civilization (Casal 1961). Sortughai, another site, north of Hindukush, again in Afghanistan furnished a sequence starting from mature Harappan period (Shortughai I) to a late phase of mature Harappan (Period II). Statistically, the relative importance of Mature Harappan elements decrease and some of

the ceramic shapes change. At the same time, new shapes appeared and that can be related to the Central Asiatic material. The architecture did not change in a significant manner but the working of lapis lazuli stopped (Frankfort 1979: 93).

The devolution or gradual transformation of the Harappan civilization from mature to late is very clear in pottery forms from Manda in Jammu, Dher Majra, Chandigarh and Sanghol in Punjab, Mitathal IIB, Mirzapur and Daulatpur in Haryana and Alamgirpur, Bargaon and Hulas in western Uttar Pradesh. In the late stage, the painted Harappan pottery is replaced by less intricate designs and plain unpainted ware with new pot forms especially in contemporary rural settlements. It appears that in the later stage of the Harappan civilization different types of wares such as pre-Harappan survivals, Harappan and also some non-Harappan wares like Cemetery H and Jhukar coalesced and continued. The famous metallic ring of the pottery is replaced by a feeble echo. The black-and-red, Painted Grey and Grey Wares are the new elements but found only at a limited number of sites in Jammu, Punjab and Haryana. Being a part of a successive culture, these wares are not discussed in detail with late Harappan pot forms.

In the later stage of the Harappan civilization the pottery such as goblets, beakers, perforated and certain other types of jars and vases which derived their forms and designs from mature phase indicated a general decadence in fabric, potting and treatment of surface. From Chenab to Sutlej and Yamuna including Sarasvati and Drishadwati, characteristic classical forms like dish with projected rim and carinated shoulder, globular vessels with a flange round the neck, shallow dish with incurved rim, perforated pot and jar stand with a concave profile were noticed but in a limited number, whereas a few new forms such as dish-on-stand with drooping rim, jar with horizontally a played out rim, medium sized jar with everted rim, bowl-like-lid with central knob and few miniature pots with a ring or pedestalled base were in profusion. The classical tall storage jar with or 'S'-twist found at Mohenjo-daro, Harappa, Lothal and Kalibangan etc. is completely absent.

Relative Chronology – Survival of Characteristic Traits from Mature to Late Harappan			
Sr. No.	Characteristic Traits	Harappa	Late Harappa
1.	Dish-on-stand	✓	✓
2.	Goblet	✓	✓
3.	Perforated Jar	✓	---------
4.	Beaker	✓	✓
5.	Typical painted design pipal leaf and Intersecting circles	✓	---------
6.	Graffiti	✓	---------
7.	Burnt-brick (4:2:1)	✓	---------
8.	Cart Frame & wheel	✓	✓
9.	Triangular cakes	✓	---------
10.	Chert blade	✓	---------
11.	Carnelian beads barrel type	✓	---------
12.	Faience	✓	✓
13.	Steatite beads	✓	✓
14.	Steatite Seals & Sealings	✓	---------
15.	Lapis-Lazuli beads	✓	---------
16.	Copper and bronze vessels	✓	---------
17.	Shell	✓	✓
18.	Cemeteries	✓	✓

Emergence of New Traits in Late Harappan		
Sr. No.	New Traits	Late Harappan Horizon
1.	Dish-on-stand with drooping rim	✓
2.	Prominent drum of dish-on-stand	✓
3.	Jar with horizontally splayed out rim	✓
4.	Bowl-like-lid with Central knob	✓
5.	Exterior Incised decoration on jars	✓
6.	Mat and bold curves in painted designs	✓
7.	Stylization of birds in painted design	✓
8.	Animal headed handled pots	✓
9.	Terracotta beads – short barrel bicone type	✓
10.	Oblong terracotta cakes with finger impressions	✓
11.	Burnt bricks (unusual ratio) with finger marks	✓
12.	Indeterminate terracotta object ending with two carves	✓
13.	Terracotta animal figurine with elongated thin body	✓
14.	Burials in habitational area	------ (except at Bhagwanpura)
15.	Long-necked flask	✓

The main Harappan sites in northern India are Ropar, Sanghol, Mitathal, Alamgirpur and Hulas. In thick grey ware types associated with this period, are limited

such as basins with out-turned rim, thick jars with under-cut rim and bowls with everted rim. The painted motifs confined to less sophisticated designs from simple bands to triangles and mat designs to intricate ones including peacock or crane. The classical designs like *pipal* leaf, intersecting circles, etc. are rare. The incised decorations which are confined to the exterior conform to Bara pattern, whereas the internally incised designs are totally absent in this late phase.

From Kotla Nihang Khan to Hulas including Manda, one can see in pottery forms and painted designs, a continuous sequence representing the different stages of cultural development or devolution from urban settlements to rural ones in this region.

In late mature Harappan and late Harappan context the type sites representing different regions are Sanghol and Chandigarh, Mitathal and Daulatpur, Alamgirpur and Hulas.

The pottery of Late Harappan period in Upper Ganga-Yamuna *doab* revealed a typological affinity with the Ochre Coloured Ware which is also circumstantially associated with the Copper Hoards in western Uttar Pradesh. This ware as it also has a few negligible cultural traits of the Harappan civilization. However, in Central Ganga-Yamuna *doab* where OCW is also reported in excavations at Atranjikhera, Saipai and Pariar, no such Harappan contact is discernible.

In late Harappan context, the typological relationship of pottery with Bara ware is not clear except that the middle and upper levels of Bara came in contact with mature and late Harappan phases. However, Sharma assigns to Bara a distinct status and calls all the Late Harappan pottery in Punjab, Haryana and western Uttar Pradesh as Bara ware.

Hulas is a site in hinterland, supporting urban centres and belongs to the Mature Harappan period according to the date bracket. The cultural traits of Hulas are more common with Harappans of Sutlej complex particularly in pottery types, painted designs (especially peacock), survival of script and also in the concept of platform which might have been raised because of the flood. But no burnt brick was encountered in lower/or middle levels which is the hallmark of the monumentality of the Mature Harappans including its other urban traits. The presence of some Harappan antiquities shows the contacts/ or contemporaneity of the settlement with Mature Harappans. The limited kiln bricks found at Alamgirpur do not suggest its use on large scale as majority of structures recovered in excavations from the adjoining areas were either of mud-brick

or simple huts. Harappans were known for using wells even though they lived by the side of the rivers. In these wells only the wedge-shaped kiln-burnt bricks could be used. In the upper levels of Hulas such wedge-shaped kiln-burnt bricks were encountered in a re-used form as steps. But in all the developmental phases of Hulas, no use of kiln-burnt bricks was noticed except mud-bricks and huts of various dimensions. In Haryana, the Early Harappan fabrics continue with Mature and Late Harappans at Balu, Banawali and Rakhigarhi, but these Early Harappan fabrics never entered the Gangetic *doab*, or to be precise, there were never any forays even into Sutlej valley. However on the whole it seems, Hulas had no visible traits of Mature Harappan except that it might be a localized contemporaneous indigenous culture having contacts with Mature Harappans. Bara culture has also been termed as a localized culture. The Harappan expansionism with indigenous intermingling will always resonate with their adventure in the plains of upper Ganga-Yamuna *doab*.

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Appendix – I

Indus Sealing from Hulas

The sealing was excavated under the direction of K.N. Dikshit of the Archaeological Survey of India from the Harappan site of Hulas, district Saharanpur, Uttar Pradesh. The sealing is an impression from a rectangular stamp-seal. The text comprises three signs and is complete. The line is to be read from right to left as usual. The script is in the mature Harappan style. It measures Length 56.69 mm; Breadth 39.17 mm, Thikness 22.64 mm. It was found from an unstratified deposit Reg. No. 990. (Pl. 1).

The 3 signs are (from the right) No. 249, 169 and 342 in the sign list. The text is already known from No. 2600 (Mackay 1937; No. 600), No. 5404 (Vats 1940: No. 1241) and No. 6128 (Mackay 1943: pl. LI-28) respectively from Mohenjo-daro, Harappa and Chanhu-daro. The text also occurs on the reverse side of a copper tablet from Mohenjo-daro (No. 2912).

If the middle sign (No. 169) is taken as a variant of sign (No. 162) the text can also be compared with No. 4650 (Vats 1940: 650) from Harappa.

There are also a large number of texts (about 80) in which the present inscription occurs as part of longer lines (Mahadevan 1977: pl. 624-627).

I. Mahadevan

Appendix - II

Exploration in the Upper Gangetic Doab

Since the discovery of Alamgirpur in 1959, the antiquity of Gangetic doab was pushed back to Harappan times (*IAR* 1958-59: 50-55). Later on Harappan remains were also noticed in the districts of Muzaffarnagar, Meerut and partially in Bulandshahr, although the remains in the last mentioned district require further work for defining this complex as Harappan. Thereafter, planned exploration of district Saharanpur by Shankar Nath under the scheme of Village to Village Survey of Antiquarian Remains revealed a cluster of Harappan sites for the first time in this region (*IAR* 1963-64: 53-56, 1964-65: 43-44, Shankar Nath 1971-72: 14-15). This work was followed by a limited excavation at Bargaon, a site about 18 km., north of Saharanpur (*IAR* 1963-64: 53-56). In 1978-79 the site of Hulas located along the eastern Yamuna canal was subjected to a large scale excavation and the results were presented in the Harappan Conference at Srinagar. Since than one more season's work was completed which provided us new substantive data for this peripheral region.

Earlier Survey

The Harappan sites are confined in Upper doab. The Maskara, Katha Nala, Krishni and Hindon are the main tributaries of Yamuna occupied by Harappan (Deshpande 1977, Dikshit 1970: 21-28). No site was noticed on the Yamuna proper. The total number of sites may be around 70. The sites explored so far appear to represent only rural settlements and in general terminology was termed as 'Late Harappans' (Dikshit 1979: 123-133). The culture at this stage became impoverished as is evident from the absence of some characteristic traits representing the hall mark of this civilization. A few important sites having Harappan assemblage are discussed hereunder district-wise. (While working at that time the relationship of rural and urban settlements was not given any weightage).

District Saharanpur

Bahupur

Bahupur is about 8 km west from Saharanpur and is close to the Railway line Saharanpur-Ambala. One of the branches of the East Yamuna canal flowing by the side of the site has cut the mound. The exact height of the site could not be determined by

the exposed sections of the canal. It revealed an occupational thickness of about 0.50 m including those of late cultures.

The earlier ceramic industry of the site is Harappan and an ill-fired red ware which looks like ochre-coloured ware. In texture this ochre-coloured ware is slightly different from its counterpart in Ganga valley which is more powdery and sticks to hand when the sherd is rubbed. The terracotta cakes which are of two varieties recall the terracotta cakes found in the excavations at Bargaon. A barrel-shaped faience bead is an interesting find from this place.

The site also yielded wares of later periods.

Pilakhni

Pilakhni about 11 km west of Saharanpur is on the railway track Saharanpur-Ambala and the old site is about half a kilometre north-west of the station. The site which has occupational deposit of about 1.5 m is partly covered by the modern village Pilakhni. One of the branches of the east Yamuna Canal cuts the mound into two parts. The exposed section of the canal yielded Harappan pottery and also a few sherds of the so-called ochre-coloured ware. A Harappan ring-stand painted with horizontal bands was also picked up from this place.

The western part of the mound is intact.

Chilhera

Situated on the right bank of the river Nagadoi, a tributary of the Yamuna, nearly one kilometre south-east of the village, the mound covers an area of about 200 X150 metres. The pottery picked up is plain and painted. A few sherds of the so-called ochre-coloured ware and terracotta cakes of oval and round varieties were also noticed.

Krishni

Situated about 12 km south-east of Saharanpur and about one kilometre west of the village across the main east Yamuna Canal, the site has an occupational thickness of about 1.50 metres. The major portion of the mound is under cultivation. In exploration it yielded typical Harappan and so-called ochre-coloured wares along with terracotta animal figurines and cakes. The incised sherds of this place can be compared with Bara in east Punjab.

Kalahetti

This site is about 12 km south of Gangoh and is approachable via Machhrauli village. It covers an area of about 200 metres in diameter and is about 5 metres high from the ground level on the east. Besides plain and painted Harappan pottery, it also yielded terracotta figurines, cakes, cart-frames and hubbed-wheels.

Tatarpur Kalan

The exploration at Tatarpur Kalan, situated about 6 km south-west of Gangoh, has yielded, besides the typical plain and painted Harappan pottery a few doubtful pre-Harappan sherds. A solitary bead of agate was also found. The site needs a trial-trenching for determining the earliest ceramic industry at this place.

In recent years a few more sites having Harappan pottery and so called ochre-coloured ware noticed in the Yamuna valley of this district, but all these sites were badly disturbed. It is interesting to note that nowhere the occupational thickness is more than one metre including the deposit of successive cultures. A few sites which have revealed typical Harappan pottery are located at Piki, Redi Malakpur, Nayavans alias Nayagaon, Fatehpur Gujar, Chhaparheri, Salarpur, Khatauli, Kaulakheri, Sarkari Sheikh and Ratna Kheri. From Nirpalpur – also called Domwala, besides Harappan pottery, an interesting terracotta bull head was also noticed.

District Muzaffarnagar

Bhura

Situated at a distance of about 8 km north of Kairana, the ancient site at Bhura is located along the dried bed of Katha Nala, a tributary of the river Yamuna. It extends in an area of about 200 X 200 sq. m and has a thickness of about 3 metres including the occupation of successive cultures. The site revealed three cultural periods, earliest occupation of which has unmistakable Harappan pottery complex. Amongst the antiquities only terracotta cakes were found.

District Meerut

Singauli Taga

In 1966, another Harappan site was explored at Singauli Taga on the left bank of river Hindon. It is about 8 km south of Alamgirpur. The site which covers an area of about 150 X 150 metres is badly denuded and is under cultivation.

Recent Data

While the excavations at Hulas were underway, a further systematic exploration of Katha Nala and Krishni, both tributaries of Yamuna, falling in the geographical limits of district Saharanpur and Muzaffarnagar were undertaken (Dikshit, *IAR* 1979-80: 80-81). The exploration revealed following ten single culture Harappan sites in district Muzaffarnagar and one in district Saharanpur.

These sites found in exploration provided a connecting link with sites located on one hand in district Saharanpur and on the other in district Meerut. The material complex picked up from the sites on the Krishni conform more or less to Alamgirpur assemblage whereas that of the Katha Nala with Hulas. The spacing of these sites is about 8 to 10 km and nowhere the actual occupational thickness is more than 0.50 to 1.80 m. Except Banti Khera-I, which is about 2 metres high from surrounding plains, other sites are completely destroyed. Special mention be made of a bowl-on-stand found at Banti Khera-I. At Jasala traces of mud platform overlying the natural soil was also observed in one of the exposed section.

S. No.	**Name of Site**	**River valley**	**District**
1.	Tikrol	Katha Nala	Saharanpur
2.	Rahatpur	-do-	Muzaffamagar
3.	Hatchhoya-I	-do-	-do-
4.	Hatchhoya-2 (locally known as - Sujangarhi).	-do-	-do-
5.	Un	-do-	-do-
6.	Jandheri	Krishni	-do-
7.	Thana Bhawan	-do-	-do-
8.	Bhanti Khera-I	-do-	-do-
9.	Bhanti Khera-2	-do-	-do-
10.	Samalkha (locally known as Kankar Tila)	-do-	-do-
11.	Jasala	-do-	-do-

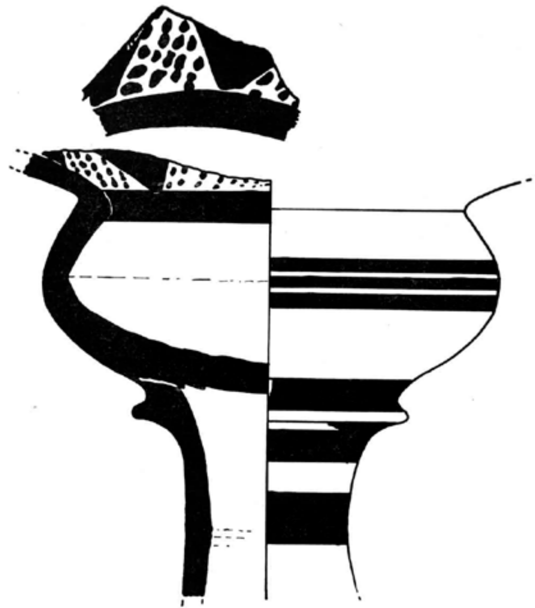


FIG. 12. *Bhanti Khera-I : Cup-on-stand*

The PGW was also picked up from Khal (locally known as Barle-ke-Qila) near Shamli and Durganpur (locally known as Harya Khera). The mounds were found located slightly away (towards the east) from the present stream say about 1 km whereas Kushan and other later settlements (Birol etc.) are further away from the river banks.

Emergent Picture

In the absence of any city or town site in Gangetic doab, it appears that Ropar was the eastern-most urban centre controlling the internal and external trade of the Harappans. The Katha Nala, Krishni and Maskara confirmed the diffusionary process of the Harappa culture which was amalgamated with regional and local variations from Sutlej to Yamuna in the east. The Harappan levels at Hulas point to a kind of cultural interaction with non-Harappan people who possibly represented the lingering remnants of pre-Harappan lineage, whereas at Alamgirpur and Bargaon no such contact is available. It was also confirmed by exploration that Harappan reached Alamgirpur on the Hindon through Krishni which joined Hindon at Barnawa. The Krishni Complex has perforated jar, Indus goblet and script, whereas Katha Nala is devoid of all these characteristics.

In the regular excavations at Hulas a terracotta sealing with three Harappan signs has been found. This discovery has necessitated to review the problem of Harappan migration to Ganga-Yamuna Doab afresh.

Significant Pottery Types from Explored Sites

A few important types from 1 to 25 with their variants were confirmed in excavations from Harappan levels at Hulas and are described below in plates from I to V (Dikshit 1982b: 113-123).

Type 1 – Vase with a flaring rim, slightly thickened at the top. Red ware, slip inside and out, traces of black horizontal bands on the neck found at Ratnakheri, Bargaon, Ambkheri, Bara, Manpur and Alamgirpur.

Variant 1a has a flattened rim. Red ware, traces of slip visible. From Kaulakheri (also from excavations at Ambkheri).

Variant 1b has a constricted neck. Dull Red ware from Chhaparheri.

Variant 1c has a horizontally flared out rim and is thinner in section. Red ware, slip inside and out, horizontal black bands painted on the rim and neck. From Chilehra (also at Atranjikhera, Ahichchhatra and Hastinapur).

Variant 1d has a slightly everted rim and wide neck. Ochre-coloured ware from Khatauli.

Variant 1e has horizontally flared out rim with a wider neck. Ochre-coloured ware from Nayabans.

Variant 1f has a prominently beaked rim. Red ware, treated with fine red slip. From Hulas.

Type 2 – Vase with a beaded rim. Red ware, gritty fabric, traces of three horizontal black bands on the neck. From Ratnakheri (also from excavation at Ambkheri).

Variant 2a has a slightly beaded rim. Red ware, traces of dark red slip inside and out. From Khatauli.

Variant 2b has a wide neck. Red ware, gritty fabric, traces of dark red slip inside and out. From Hulas.

Variant 2c has obliquely cut rim. Dull red ware, traces of brownish red slip on the outer face. From Nayabans.

Variant 2d has slightly beaded rim and is of thinner section. Red ware, dark red slip inside and out. From Nayabans.

Variant 2e has slightly flattened rim at the top. Red ware, traces of red slip inside and out. From Khatauli.

Variant 2f has an overted rim and a depression near the neck. Red ware, red slip inside and out.

Type 3 – Medium-sized storage jar with slightly heavy collared rim. Red ware, sturdy fabric, traces of red slip inside and out. From Hulas. (Also at Ambkheri and Bargaon).

Variant 3a has a more sturdy fabric. Red ware, traces of slip confined on rim only. From Nayabans.

Type 4 – Storage jar with a thick beaded rim. Red ware, traces of slip inside and out. From Kaulakheri.

Variant 4a has an everted rim forming a beak. Sturdy red ware, slip on the rim portion only, black horizontal band confined on the rim and neck. From Krishni.

Variant 4b has a beaded rim. Dull red ware, traces of slip in and out. From Nayabans.

Variant 4c has an under-cut but deformed beaded rim. Red ware, traces of slip on the rim. Surface found from Nayabans.

Variant 4d in a deep jar with flaring mouth and featureless rim. Dull red ware, traces of dark red slip inside and out. From Nayabans.

Variant 4e is a basin with a clubbed rim. Red ware, devoid of slip. From Kaulakheri.

Type 5 – *Jar with an obliquely cut collared rim.* Coarse gritty red ware. From Kaulakheri.

Type 6 – Ring stand. Red ware, sturdy fabric treated with slip inside and out. Traces of parallel black horizontal bands on the body. From Pilakhni. Ruper and Alamgirpur, also from excavations.

Type 7 – Dish with a projected rim and carinated shoulder. Ochre-coloured ware, slightly gritty fabric. From Krishni. (Also from excavations at Bargaon, Alamgirpu4r, Ambkheri and Atranjikhera).

Variant 7a has a slightly flared rim. Ochre-coloured ware. From Khatauli.

Variant 7b has slightly out-turned rim and bluntly carinated shoulder. Red ware, sturdy fabric treated with bright red slip. From Hulas.

Variant 7c has a prominently everted beaked rim. Red ware, sturdy fabric, fine red slip inside and out. From Hulas. (Also from the excavations at Ambkheri).

Type 8 – Fragmentary portion of a dish of dish-on-stand type with a slightly incurved and long drooping rim. Ochre-coloured ware, gritty fabric. From Krishni. (Also from excavations at Bargaon, Ambkheri, Ruper and Alamgirpur).

Variant 8a has an axe-like-collared rim. Red ware, slip inside and out, obliquely running black parallel lines on the rim. From Hulas.

Type 9 – Dish of a dish-on-stand type with a slightly beaked rim. Ochre-coloured ware, gritty fabric. From Chhaparheri. (Also at Ambkheri and Alamgirpur).

Variant 9a slightly deeper dish with a painted rim. Surface find from Ratnakheri.

Variant 9b with a downward pointed beak. Red ware, sturdy fabric, traces of red slip inside and out. From Nayabans.

Variant 9c with a blunt beak. Sturdy red ware with a slip inside and out, wavy and straight black bands on rim. From Hulas.

Type 10 – Dish of a dish-on-stand type with a beaded rim. Dull red ware, traces of slip inside. From Chilehra.

Variant 10a. Long pedestal base of a dish-on-stand. Red ware, slip inside and out. From Ratnakheri.

Variant 10b. Pedestal base of a dish-on-stand, red ware, coarse fabric, slip inside and out. From Kaulakheri.

Variant 10c. Small base with a thin section. Bright red ware, painted in black with plain parallel horizontal bands dividing the surface into compartments which are subsequently filled up with dashes and dots intersected with circles. From Chilehra.

Variant 10d with a grooved-basal rim. Ochre-coloured ware. Fom Khatauli.

Variant 10e with a beaded base. Ochre-coloured ware, gritty fabric. From Chhaparheri.

Variant 10f base of a dish-on-stand. Red ware, traces of slip outside, decorated with incised chevrons. From Krishni.

Variant 10g- part of a dish-on-stand. They grey ware. From Hulas. (Also present at Rupar)

Type 11- Bowl with a flared rim. Ochre-coloured ware, thin fabric. From Chhaparheri. (Also present at Ambkheri, Bargaon, Atranjikhera etc.).

Variant 11a. Similar to 11. Red ware, traces of slip inside. From Khatauli.

Type 12 - Bowl with a slightly beaded rim and flat base. Red ware and fine red slip inside decorated with black painted horizontal bands. From Nayabans.

Variant 12a has a beaded rim. Ochre-coloured ware. From Khatauli.

Variant 12b has a hooked rim. Red ware, traces of dark red slip inside and out. From Hulas.

Type 13 - Bowl with a flat rim. Red ware, coarse gritty fabric devoid of slip. From Kaulakheri.

Variant 13a has a sharply inturned obliquely cut rim forming a groove outside, slightly. Red ware, slip intact inside and cut. From Khanpur, District Bulandshahr.

Variant 13b is the base of a big deep bowl with ring base. Ochre-coloured ware, gritty fabric. From Chhaparheri.

Type 14 - Bowl-shaped lid with a central knob with corrugation marks on the interior side dull red ware, devoid of slip. From Ratnakheri. (Also present in upper levels at Mohenjodaro, Ambkheri-2, Bargaon, Bara, Alamgirpur).

Type 15 - A bottle-shaped vase with flat base and incomplete rim. Red ware, treated with red-slip externally. From Ratnakheri. Variant present at Alamgirpur.

Variant 15a is a fragmentary flat-based vase. Dull red ware. From Hulas.

Variant 15b is a flat-based vase with a fragmentary concave rim. Red ware. From Nayabans.

Type 16 - Miniature cup-shaped lamp. Ochre-coloured ware. From Chhaparheri.

Type 17 - Miniature pot with a bulged belly and flat base. Roughly potted red ware, traces of red slip externally. From Nayabans.

Type 18 - Minitature cup of slightly inverted bell type with a roughly finished flat base. Dull red ware, traces of slip externally. From Chilehra.

Type 19 - Fragmentary miniature thimble roughly potted red ware. From Kaulakheri. (Also present at Ambkheri).

Type 20 - Basin with an everted rim. Red ware with red slip inside and out. From Hulas.

Variant 20a has an externally bevelled rim. Dull red ware. From Ratnakheri. (Also present at Alamgirpur).

Variant 20b has undercut rim. Red ware, slip inside and out. From Hulas.

Variant 20c has a raised out-turned rim, carination on the shoulder. Ochre-coloured ware. From Krishni.

Variant 20d has a prominently grooved rim. Traces of red slip externally. From Khanpur, District Bulandshahr.

Variant 20e has a beaked rim, ochre-coloured ware. From Chhaparheri.

Variant 20f has a ring base of dish. Red ware, treated with fine red slip inside and out. From Ratnakheri.

Type 21 - Basin with a beaked rim flat at the top but forming groove outside. Red ware, slip inside and out. From Nayabans.

Variant 21a is flattened at the top. Red ware. From Kaulakheri. (Also present at Ambkheri).

Variant 21b is thinner in fabric and without any flattening at the top. Ochre-coloured ware. From Krishni.

Variant 21c has an out-turned rim, slightly undercut externally. Red ware. From Ratnakheri.

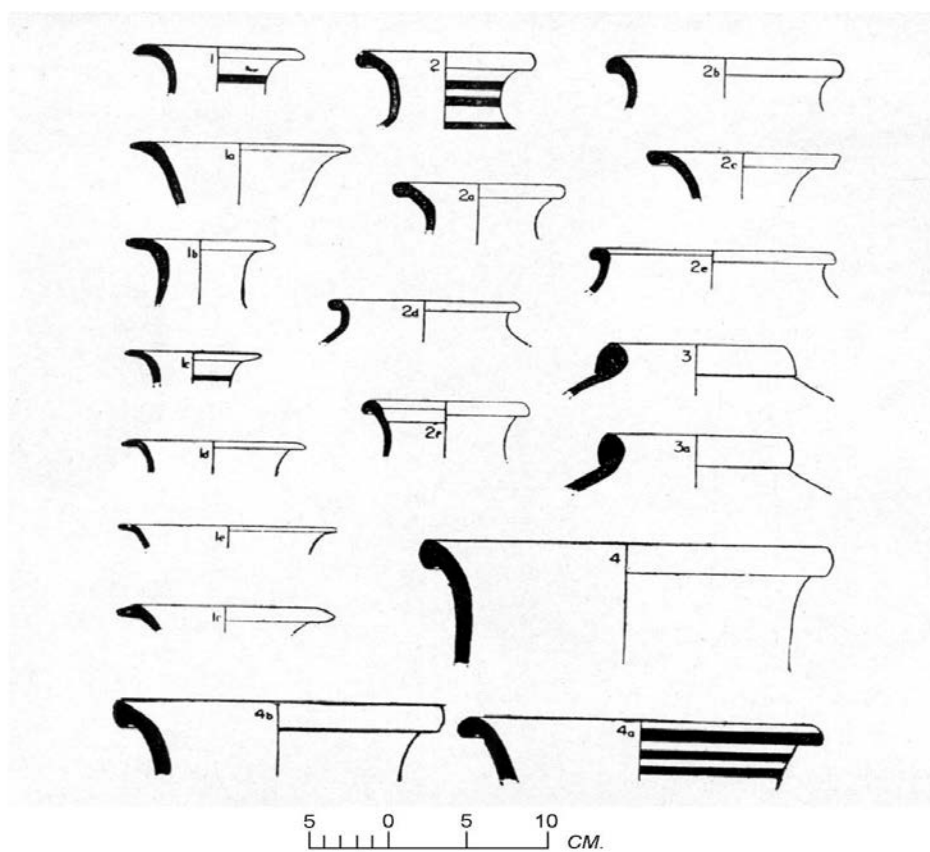
Type 22 - Basin with a hooked rim and carinated shoulder. Red ware, traces of slip inside and out. From Katpalon, District Jullunder.

Variant 22a has a slightly thinner section. Ochre-coloured pottery. From Sandhya, Distt. Ambala.

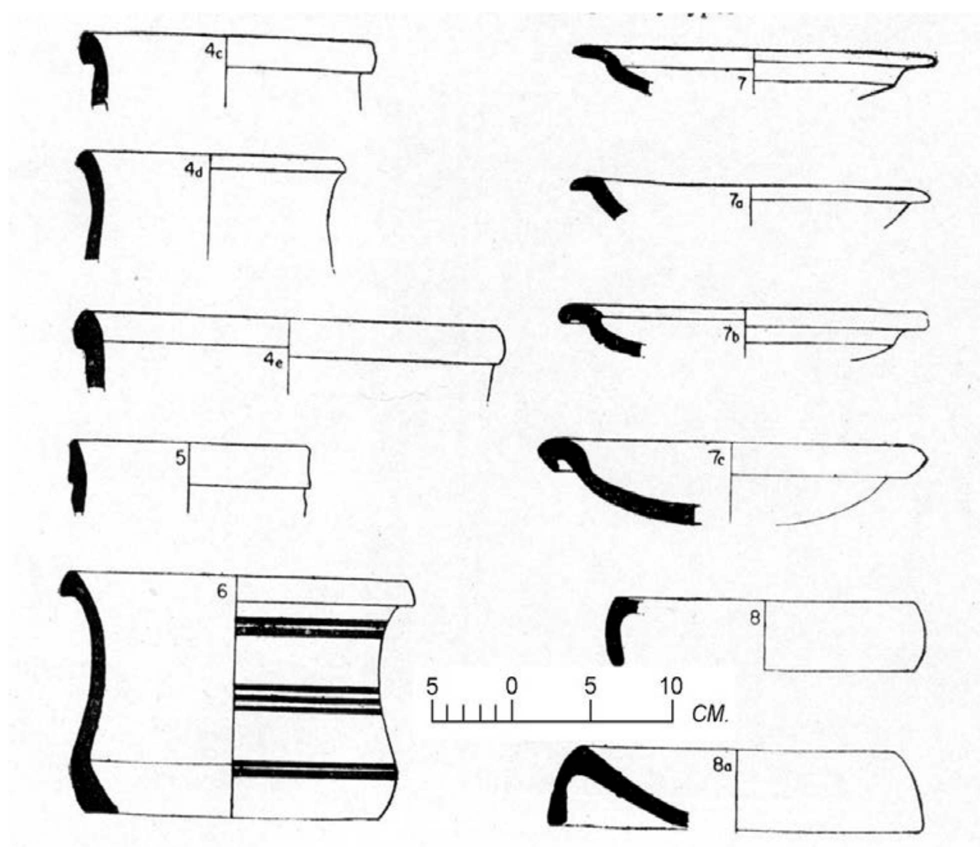
Type 23 - Basin with a beaked rim with a ridge outside and flat base. Roughly potted. Thick dull red ware with traces of red slip. From Khanpur, Distt. Bullandshahr.

Type 24 - Dish of a specialized shape with a ring-base. Ochre-coloured ware. From Sandhya, Distt. Ambala.

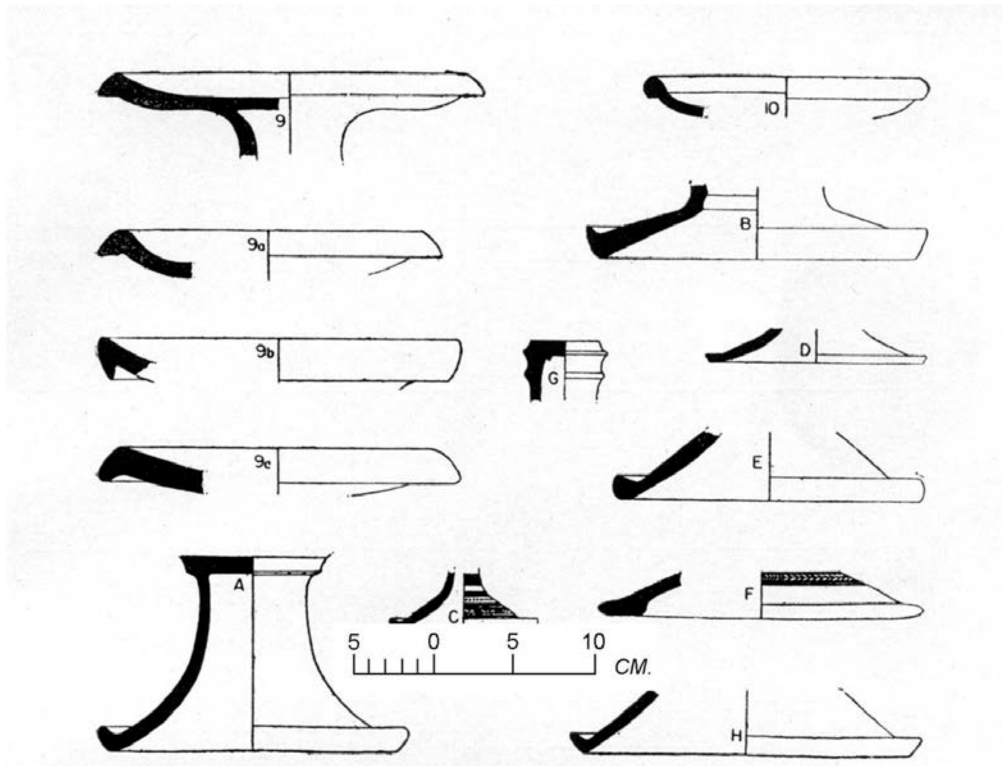
Type 25 - Large basin with beaked rim. Fine red ware, treated with slip inside and out. From Hulas.



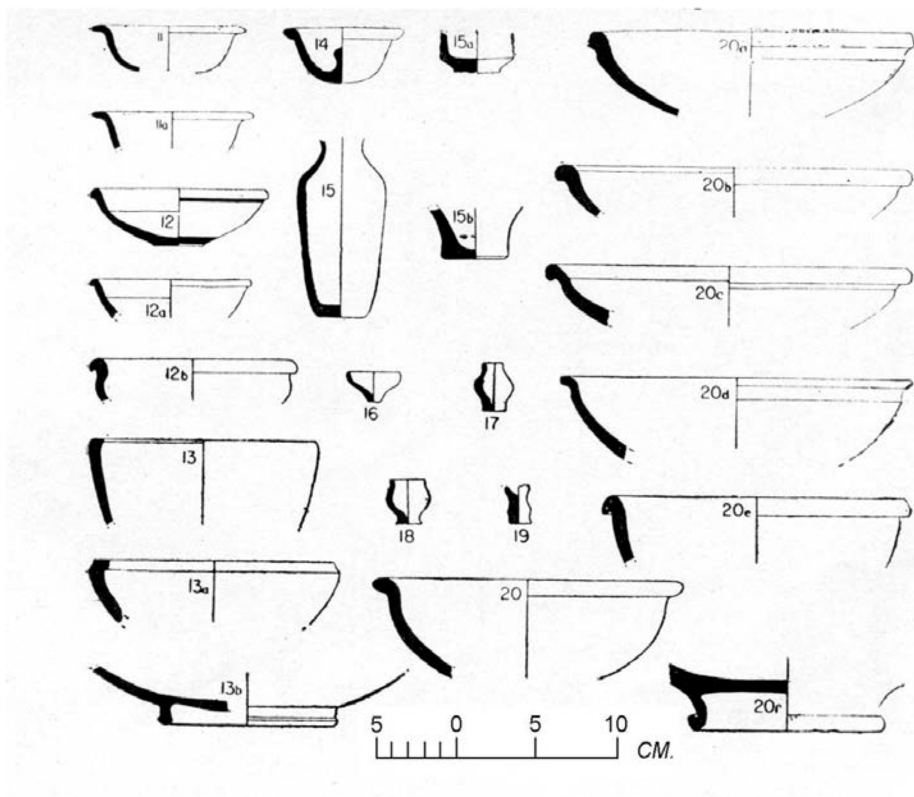
Pl. I. Significant pottery types



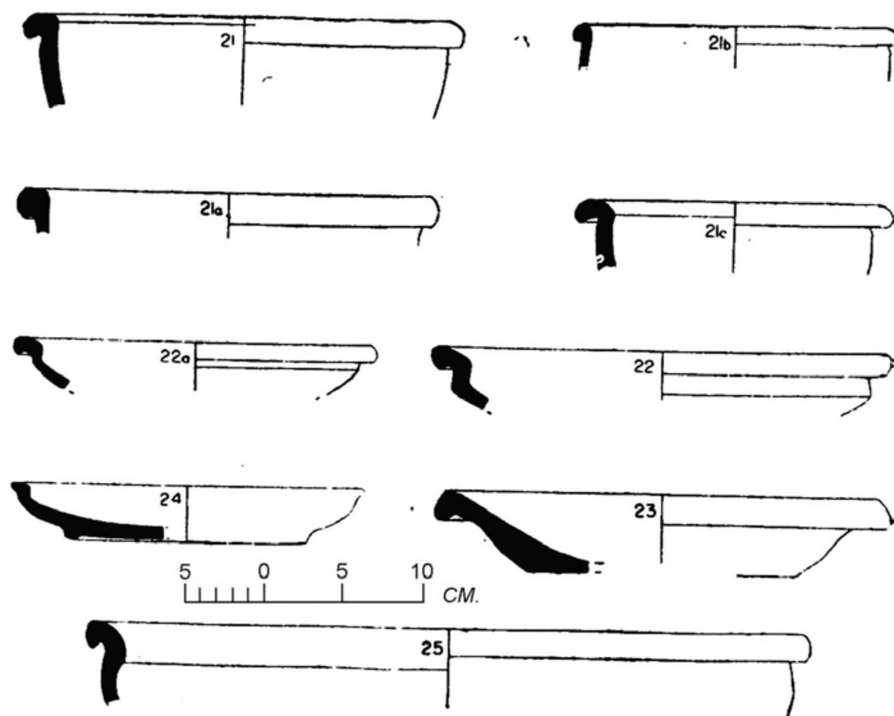
Pl. II. Significant pottery types



Pl. III. Significant pottery types



Pl. IV. Significant pottery types



Pl. V. Significant pottery types

Appendix – III

Plant Economy of Late Harappans at Hulas

K.S. Saraswat

The ancient mound, located in the revenue limits of the village Hulas (Lat. 28°43'N; Long. 77°22'E) in Nakur Tahsil of Saharanpur District, western Uttar Pradesh, was subjected to a large scale excavation by the Archaeological Survey of India in 1978-79, under the direction of K.N. Dikshit. The mound measured 330 x 172m in area and was found damaged by villagers who levelled down a sizable part of it for agricultural operations. On excavation, about 5 m thick deposit of ancient occupation was found. It is divisible into five distinct cultural periods. Of these, the earliest Period-I represented by 1.40 m thick deposit on the natural soil yielded Harappan red ware, alongwith non-Harappan red and thick Grey wares. Empirical study of the data available from Hulas and many other sites in Haryana and Punjab confirms that the Harappan Civilization did have substantial influence on the cultural development of the areas outside the Indus basin. Whatever be the course followed by the Harappans, the archaeological evidences at Hulas have confirmed the diffusionary process of Harappan culture through successive adaptations to the regional cultural and environmental systems.

At Hulas are witnessed new pottery, absence of cities, relatively uniform features of architecture and house plans, and some cultural items first recognized in the components of the Mature Harappan culture. The Late Harappans developed local variations by mingling with regional cultures until what was once typical Harappan was diluted to the point of non-existence. The Late Harappan phase in Period-I at this site, which has filled the cultural gap between the gradual end of the Harappan culture and the emergence of Iron Age culture (Painted Grey Ware) in the subsequent Period-II, has been dated on the basis of typological study between *Ca* 1700 and 1000 B.C. (Dikshit 1979: 123-33; 1981: 70-76; 1982: 113-123; 1984: 253-269)

The study of Late Harappan plant economy has been taken up with an objective to assess the change in subsistence pattern during the course of Harappan migration, from the semi-arid or arid zones of Haryana and Punjab to the different climatic region of Upper Ganga-Yamuna *doab* receiving higher rainfall. Further, the study is likely to throw light on the dietary habits of the people in this region during different periods.

Materials and Methods

The majority of plant remains, dispersed in the deposits of Late Harappan culture at Hulas, turn out to be a mixture of carbonized seeds and fruits alongwith small pieces of wood charcoal. The carbonized remains represent a small fraction of plant resources utilized by ancient settlers in which food grains and fuel plants, whose processing require heating and burning, are more likely to be accidentally or deliberately charred than the plant material not exposed to fire. A few hard and woody fruit-shell and seed-coat pieces have also survived in uncarbonized state. Therefore, the archaeological record cannot be considered complete. Most of the remains are likely to have resulted from certain human activities. But the preservation of wild seeds and fruits may have been incidental. Potsherds and burnt mud-clods of plasters bearing the impressions of rice husk, which was used as *degraissant* in the clay, have also been found in the excavation.

Samples of soil containing botanical remains, potsherds and burnt mud-plaster pieces were collected from different horizons of Late Harappan deposits. Some larger and apparently visible remains were sorted out from the soil with the help of a forcep. In view of obvious problems in the systematic recovery of material by hand, the soil samples were immersed in water and agitated so that light carbonized remains buoyed to the surface and washed out through a standard geological sieve of 25 mesh. As a result, the seeds and other material remains, as small as 0.7 mm, could be retained on the sieve. Individually separate seeds and fruits were cleaned in acid-alcohol (Glacial Acetic Acid 10% + Ethyl Alcohol 50% in equal volumes) with the help of soft camel-hair brush. Their identification has been made on the basis of comparison with authentically identified extant material, under a stereobinocular microscope. Deformation due to over-burning a puffing in a large number of seeds and fruits rendered their specific identification not discernible. This made considerable data loss for which no correction is possible. Only recognizable fractions of the samples of seeds and fruits have been presented in this paper, taking into account the changes in their shape, size and proportions caused by carbonization.

The study of grain and husk impressions in the matrix of potsherds and mud-plaster has also been made under a stereobinocular microscope. Cuticle remains obtained from the soil on being cleaned in 5% acetic acid and treated with 10% hydrogen peroxide revealed the cellular structure, but they disintegrated when mounted in Canada balsam. It could, however, be possible to photograph them in glycerine drop on a slide. Sectioning of wood charcoal pieces was done with rotary microtome by following the

method of double embedding in celloidyin and paraffin, as suggested by Chowdhury and Ghosh (Chowdhury and Ghosh 1951: 3-19). The results of botanical analysis along with the archaeological provenance of samples are given in Table 1.

Table1. Plant Remains Recovered from Hulas (*Ca.* 1700-1000 B.C.)

Sl. No. 1	Archaeological Number of Samples 2	Nature of the Material 3	Results of Study 4
1.	HLS. 82-83 Trench: XC-9, Qdt.2 Stratum: 10 Depth: 2.05 m	Carbonized seeds and fruits	Barley (*Hordeum vulgare*), Wheat (*Triticum sphaerococcum*), Field pea (*Pisum arvense*) Green-gram (*Vigna radiata*).
2.	HLS. 82-83 Trench: XG-9, Qdt.1 Stratum: 9 Depth: 1.82 m	Carbonized seeds and fruits	Barley (*Hordeum vulgare*), Rice (*Oryza sativa*), Lentil (*Lens culinaries*), Field pea (*Pisum arvense*), Oat (*Avena sativa*), Wheat (*Triticum sphaerococcum*), Cotton (*Gossypium/ arboreumherbaceum*).
3.	HLS. 82-83 Trench: XG-9, Qdt.1 Stratum: 8 Depth: 1.64 m	Carbonized seeds and fruits	Rice (*Oryza sativa*), Wheat (*Triticum sphaerococcum, T. aestivum*), Jowar (*Sorghum bicolour*), Ragi-millet (*Eleusine coracana*), Green-gram (*Vigna radiata*), Horse-gram (*Dolichos biflorus*), Chick-pea (*Cicer arietinum*).
4.	HLS. 82-83 Trench: XG-9, Qdt.1 Stratum: 7 Depth: 1.42 m	Carbonized seeds and fruits Cuticle pieces. Uncarbonized pieces of fruit shell (Endocarp) and seed-coat	Rice (*Oryza sativa*), Chick-pea (*Cicer arietinum*), Horse-gram (*Dolichos biflorus*), Green-gram (*Vigna radiata*), Grass-pea (*Lathyrus sativus*). Cuticle pieces of rice-husk Endocarp (shell) pieces of Almond (*Prunes amygdalus*) and seed-coat piece of Castor (*Ricinus communis*)

5.	HLS. 82-83 Trench: XJ-8, Qdt.2 Stratum: 5 Depth: 0.90 m	Carbonized seeds and fruits Wood charcoal pieces Fruit-shell (endocarp) pieces.	Rice (*Oryza sativa*), Barley (*Hordeum vulgare*), Wheat (*Triticum sphaerococcum*, *T. aestivum*), Field pea (*Pisum arvense*), Grass-pea (*Lathyrus sativus*), Oat (*Avena sativa*). Babul (Acacia nilotica) Broken pieces of walnut (Juglans regia) shell.
6.	HLS. 82-83 Trench: XJ-8, Qdt.2 Stratum: Pit 2 S.B. 1. Depth: 0.40-0.60 m	Carbonized seeds and fruits Potsherds bearing impressions of some grains and husk.	Rice (*Oryza sativa*), Wheat (*Triticum sphaerococcum*), Barley (*Hordeum vulgare*), Kundru or Ivy Gourd (*Coccinia cordifolia*). Husk impressions of cultivated rice (*Oryza sativa*).
7.	HLS. 82-83 Trench: XJ-8, Qdt.3 Stratum: Pit 4 SB. 1. Depth: 0.56-0.60 m	Carbonized seeds and fruits	Rice (*Oryza sativa*), Oat (*Avena sativa*), Jowar-millet (*Sorghum bicolour*), Field pea (*Pisum arvense*), Lentil (*Lens culinaries*), A Wild Grass-Anjan (*Cenchrus ciliaris*)
8.	HLS. 82-83 Trench: XJ-8, Qdt.3 Stratum: 3 Depth: 0.52-0.56 m	Burnt mud-plaster bearing husk impressions	Husk impressions of cultivated rice (*Oryza sativa*), along with those of a wild rice comparable to *Oryza rufipogon.*
9.	HLS. 82-83 Trench: XJ-9, Qdt.2 Stratum: 3 Depth: 0.56 m	Carbonized seeds and fruits Uncarbonized broken pieces of some fruit	Rice (*Oryza sativa*), Wheat (*Triticum aestivum*), Green-gram (*Vigna radiata*), Cow-pea (*Vigna unguiculata*). Fruit (Syconium in botanical sense) of Pipal tree (*Ficus religiosa*)
10.	HLS. 82-83 Trench: XJ-9, Qdt.2	Carbonized seeds and fruits	Wheat (*Triticum sphaerococcum*), Lentil (*Lens culinaries*), Rice (*Oryza sativa*), Green-gram (*Vigna radiata*)

	Stratum: 3 Depth: 0.76 m		
11.	HLS. 82-83 Trench: XJ-9, Qdt.2 Stratum: 3 Depth: 0.75 m	Carbonized seeds and fruits Uncarbonized piece of Seed-coat	Barley (*Hordeum vulgare*), Rice (*Oryza sativa*), Lentil (*Lens culinaries*), Wheat (*Triticum sphaerococcum*). Castor (*Ricinus communis*)
12.	HLS. 82-83 Trench: XJ-8, Qdt.3 Stratum: Pit 4 S.B. 1 Depth: 0.24-0.30 m	Broken seeds and fruits in carbonized state Potsherds bearing husk impressions	Rice (*Oryza sativa*), Barley (*Hordeum vulgare*), Wheat (*Triticum sphaerococcum/ aestivum*), Lentil (*Lens culinaries*). Husk impressions of cultivated rice (*Oryza sativa*).
13.	HLS. 82-83 Trench: XH-9, Qdt.3 Stratum: 3 Depth: 0.55-0.60 m	Broken seeds and fruits in carbonized state Potsherds with husk impressions	Barley (*Hordeum vulgare*), Rice (*Oryza sativa*), Lentil (*Lens culinaries*), Wheat (*Triticum aestivum aestivocompactum*). Husk impressions of cultivated rice (*Oryza sativa*).
14.	HLS. 82-83 Trench: XG-9, Qdt.4 Stratum: 1 Depth: 0.00-0.08 m	Burnt mud-clods and pottery bearing copious husk impressions	Husk impressions of cultivated rice (*Oryza sativa*) along with those of some wild species (cf. *Oryza rufipogon*).

Plant Remains

The plant remains comprise carbonized and uncarbonized seeds, fruits, impressions on plaster-pieces, burnt mud-clods and potsherds, epidermal peels and wood charcoals. The results of their study have been grouped as given below:

1. Rice *(Oryza* L.) (Pl. l Figs. 1-2; PI. 3, Figs. 28-31; P1.4, Figs. 32-33)

All the 29 carbonized grains in this lot are without husk. The grains are elongate to oblong in shape, laterally flattened and prominently ribbed, measuring 3.30-5.30 mm in length, 2.00-2.70 mm in breadth and 1.50-2.00 mm in thickness. The position of embryo is well marked in most of the grains. The grains show close resemblance with those of rice *(Oryza* sp.). The differentiation between the cultivated and wild species of rice, only on the basis of rice kernels without husk, is difficult to untangle. The reason is that the cultivated rice *(Oryza sativa)* and its varieties grown in different geographical and climatic conditions show enormous divergence in shape, size and other diagnostic features. Among several perennial and annual wild species of *Oryza,* which grow as weeds in the swampy cultivated fields of paddy crop, *Oryza rufipogon* is a highly variable perennial species closely resembling the cultivated forms of *Oryza sativa.* Boldness of grains gives appearance of cultivated rice. This wild rice is also occasionally harvested with cultivated crop. Further, weedy forms intercross rather freely with one another, and cultivated rice as well. Cultivated characteristics are often transferred to spontanea races. The situation thus becomes genetically messy and the interactions between cultivated and wild species of rice are so extensive that the differentiation in the grains, especially in carbonized state, becomes perplexing. It is, therefore, not possible to incontestably infer whether all the grains from Hulas (Figs. 1-2) belong to cultivated taxa or represent the mixture of cultivated and wild species of rice.

Further evidence of rice has been sought in the husk or glume impressions preserved in potsherds (Figs. 29-31) and burnt mud-clods and plaster-pieces (Figs. 32-33). Pottery and burnt pieces of mud and plasters bearing rice-husk impressions were broken open and in quite a few of them copious impressions were found. The mixing of rice-husk as *degraissant* in the clay resulted in the breaking of glumes and their irregular plane. Consequently, complete impressions are less frequently met with. Firing brought shrinkage in the size of husk. The study has, therefore, been confined to the features of tissue and no allowance could be made for the amount of reduction in the size of husk pieces.

The impressions reveal detailed ornamentation pattern on the surface of glumes i.e. lemma and palea Lemma is boat-shaped with convex outerside, partially enclosing the palea. The granules present on their surface give the appearance of 'chess-board' pattern of tissue. Embracive investigations on the epidermal structure of lemma and palea of a wide range of wild and cultivated species of *Oryza* have been carried out by Savithri (1976) and Sharma (1983). The impressions showing dark areas at the points where four genules unite, almost cubicular shape of granules and at places their alignment in

horizontal wavy rows (Figs. 30, 33) compare closely with those of some varieties of universally cultivated *Oryza sativa* L. Quite a few impressions of the type as shown in Fig.31 reveal closely spaced rounded granules protuded from the surface and aligned in straight rows. Such types of impressions appear to be of the slender grains, which are relatively much longer than broad. Critical observations show that they resemble the features of perennial, seed propagated and highly variable wild rice—*Oryza rufipogon* Griffith. Biologically and morphologically, this species, growing as a weed, resembles *Oryza sativa* and produces fertile hybrids in cultivated rices. The occurrence of husk impressions of cultivated as well as wild rice together indubitably indicates that the wild rice growing as a weed in fields was also harvested along with the cultivated rice.

2. Dwarf Wheat *(Triticum spaerococcum* Perc.) (Pl. Fig. 3)

All the 33 complete grains in this lot, in spite of some puffing during carbonization, retain their broad and more or less rounded shape with broad and circular hump on the dorsal side. The cheeks along the sharp and deep ventral furrow are puffed. Embryo is rather large. The pericarp has got partly rubbed off. Grains measure 5.00-5.75 mm in length, 2.60-3.50 mm in breadth and 2.00-2.75 mm in thickness. On account of morphological features the grains are comparable to those of dwarf wheat *(Triticum sphaerococcum).*

3. Bread/Club Wheat *(Triticum aestivum* L. */T. aestivo-compactum* Schiemm.) (Pl. 1, Figs. 4, 5)

Eight grains measuring 5.00—6.00 mm in length, 2.70-380 mm in breadth and 2.20-2.75 mm in thickness are slightly narrower towards both the ends and broader in the middle. Thickest portion is near the embryo, the dorsal side is rounded, cheeks to the deep ventral furrow are also rounded, and the embryo is steeply placed. Pericarp of some grains has go^ partially rubbed off during their preservation in carbonized condition. On the basis of shape and other morphological features, the grains compare with those of *Triticum aestivum* (bread wheat). A few more plump grains of bread wheat-type in the collection having somewhat flattened area on smoothly rounded dorsal side appear to be similar to club wheat *(Triticum compactum).* Nevertheless, it is difficult to make such differentiation when no rachis pieces are found. Under the circumstances when the number of grains is limited, they may safely be regarded as *Triticum aestivum—aestivocompactum* Schiem. This, however, surmounts the difficulty of nomenclature, but does not unravel the problem of identification.

4. Jowar-millet *(Sorghum bicolor* (L.) Moench.) (Pl. 1, Fig. 6)

Five carbonized grains oblong to obovate and dorsoverntraily symmetrical, measure 3.30-4.00 mm in length, 2.40-3.30 mm in breadth and 2.00-2.80 mm in thickness. Oval-round hilum scar is one-third to half as long. The morphological features indicate their resemblance with those of sorghum-millet *(Sorghum bicolor).*

5. Barley *(Hordeum vulgare* L emmend. Bowden) (Pl. 1, Figs. 7, 8)

In all, there are 4 carbonized grains in the collection. They are elongated and measure 5.00-6.50 mm in length, 2.40-3.30 mm in breadth and 2.00-2.60 mm in thickness. The embryo is situated on the beak-like projection of flatfish dorsal side. Ventral furrow goes upward from the base and gradually widens towards the upper end of the grain. Glumes are attached to the surface of grains by fusion of tissues and show longitudinal striations on their surface, resulted by closely running husk-veins. Husk at places disappeared as a consequence of heat and wear. In size and shape, the carbonized grains compare with those of barley *(Hordeum vulgare).* The grains reveal mixture of straight grains showing a distinct bulge in the middle as well as comparatively smaller, asymmetrical grains showing ventro-lateral twist. In view of this fact, the barley belongs to six-row form. In this form the tough rachis bears three grains per node. Median grains are symmetrical and the lateral ones, being smaller and asymmetrical, develop ventro-lateral twisting. All the species of barley belong to the same interfertile population and are grouped under single species-*Hordeum Vulgare* L. emmnd. Bowden. The barley from Hulas has, therefore, been placed under six-row form of hulled *Hordeum vulgare.* In a burnt plaster piece (Fig 8), a hollow cast of barley grain has also been noticed.

6. Oat *(Avena saliva* L.) (Pl. 2 , Fig. 9)

Five grains in semi-carbonized state are elongated and lanceolate in shape, measuring 5.30-6.50mm in length, 2.00-2.50 mm in breadth and 1.70-2.00 mm in thickness. In general appearance they compare with the spikelets of some species of oat *(Avena).* Unlike many wild species of oat in which the spikelets separate from pedicel by abscission leaving a suckermouth basal scar, the oat caryopses from Hulas appear to be separated from pedicel by fracture. In the absence of distinct sukermouth scar the grains are thus referable to a cultivated form of *Avena saliva.*

7. Finger-millet/Ragi-millet *(Eleusine coracana* (L.) Gaertn.) (Pl. 2, Figs.10, 12)

Two subglobose to oblong carbonized grains with conspicuously broad hilum, almost half of the length of grain, measure 1.60-1.75 mm in length, 1.30-1.40 mm in breadth

and about 1.00 mm in thickness. Grains have been found embedded in black tar-like material (Fig. 11), on which impressions of caryopses reveal rugose ornamentation (Fig.12). A few granules in surface ornamentation fuse together and give the appearance of wavy horizontal rows. These characteristic features of the carbonized grains compare with those of ragi-millet *(Eleusine coracana).*

8. Cow-pea *(Vigna unguiculata* (L.) Walp., Syn. V. *sinensis* Endl.) (Pl. 2, Fig. 13)

A broken piece of reniform, thick and plano-convex cotyledon is tightly enclosed by thick seed-coat (A). A piece of scraped seed-coat (B) has also been found. Seed-coat surface shows transversely oriented reticulate ornamentation. Cotyledon measures 8.00 mm in length, about 4.50 mm in breadth and 1.70 mm in thickness. In shape, size and ornamentation, the carbonized cotyledon compares with that of cow-pea *(Vigna unguiculata).*

9. Lentil *(Lens culinaris* Maedik.) (Pl. 2, Fig. 14)

Forty-one complete carbonized seeds measuring about 2.00-3.60 mm x 2.00 - 3.00 mm (L x B) are circular and flattened with keeled margins. They are more or less lenticular in appearance. Hilum is acutely lanceolate in shape and very small in size. Seed-coat in a number of seeds got partly rubbed off due to carbonization. Morphologically, the seeds are comparable to lentil *(Lens culinaris).*

10. Grass-pea/Khesari *(Lathyrus sativus* L.) (Pl. 2, Fig. 15)

Six carbonized seeds, varying from triangular to wedge-shaped in appearance, measure 4.00-4.50 mm in length, 3.50-4.00 -400 mm is breadth and 2.70-3.50 mm is breadth and 2.70-3.50 mm in thickness. Seed coat is rough-textured. Small and oval hilum has been noticed at one corner of the broader end. The seeds compare with those of *khesari (Lathyrus sativus).*

11. Chick-pea/Gram *(Cicer arietinum* L.) (Pl. 2, Fig. 16)

A complete seed and two cotyledons have been found. Seed is semi-round with one end broad and lobed, while the other end somewhat angular and beaked. The seed-coat surface is granular and slightly roughened by raised lines. Due to carbonization the hilum could not be distinctly seen, yet there is no doubt about its situation in the depression on the pointed end. Chalazal plate on the ventral side of seed is noticeably broad. The seed measures about 5.50 mm in length, 4.00 mm in breadth and 3.30 mm in thickness. Cotyledons measure about 3.75-4.00 mm x 2.80-3.10 mm x 1.50-1.80 mm (length x breadth x thickness) and their outer surface shows

undulations. On the basis of overall morphological features the seed and cotyledons have been referred to chick-pea *(Cicer arietinutri).*

12. Field-pea *(Pisum arvense* L.) (Pl. 2, Fig. 17)

Six seeds are spherical to hemispherical in shape measuring about 3.50-4.70 mm in diameter. Faintly preserved oval hilum, flush with the seed surface, could be observed only in one seed. Seed-coat is blurred and broken at places due to carbonization and puffing. The seeds resemble those of field-pea *(Pisum arvense).*

13. Cotton *(Gossypium arboretum/ herbaceum* L.) (Pl. 2, Fig. 8)

Single carbonized seed with one end rounded and lobed and the other end narrow and angular in cross view, measures 6.00 mm in length, 4.30 mm in breadth and 3.60 mm in thickness. Ventral side of the seed is more or less flattened and the dorsal side shows rounded bulging. Hilum is ventrally located on the narrow end of the seed. In all morphological respects, the carbonized seed compares with that of cotton.

14. Horse-gram/Kulthi *(Dolichos biflorus* L.) (Pl. 2, Fig.19)

In all there are 8 complete seeds and two cotyledons (shown in extreme left of upper and lower rows). Seeds are ellipsoid to somewhat kidney-shaped and laterally flattened, measuring 3.80-4.50 mm in length, 2.70-3.50 mm in breadth and 2.00-2.50 mm in thickness. Seed surface is smooth. The small elliptical hilum measures about 1.00-1.50 mm x 0.50 mm. The seeds resemble those of horse-gram *(Dolichos biflorus).*

15. Green-gram/Mung *(Vigna radiata* (L.) Wilczek.) (Pl. 2, Fig. 20)

Fourteen carbonized cotyledons, mostly elongated with angular to rounded ends, measure 3.00-4.00 mm in length, 2.00-2.50 mm in breadth and 1.00-1.50 ram in thickness. Under a stereobinocular microscope a few of them exhibit faint and wavy markings on their outer surface. It is difficult to ascertain the specific identity without the characteristic features of hilum. The cotyledons may also belong to black-gram *(Vigna mungo).* However, in view of the faint markings on their surface, the cotyledons are tentatively referred to green-gram *(Vigna radiata).*

16. Ivy gourd/Kundru *(Coccinia cordifolia* Cogn.) (Pl. 2, Fig. 21)

Four complete and broken oblong to somewhat elongated seeds with velvetty smooth surface and compressed margins, measuring 4.00-4.40 mm in length, 1.70-2.00 mm in breadth and 1.20-1.50mm in thickness, compare with those of *kundru (Cocciniaa cordifolia).*

17. Pipal-tree fruit *(Ficus religiosa* L.) (Pl. 3, Figs. 22, 23)

Three uncarbonized broken pieces (Fig. 22) are comparable to those of rounded to obviate fruits of *Ficus religiosa.* Botanically, the receptacle has by involution developed into a hollow fleshy axis (termed as syconium), bearing single-seeded fruits on the inner surface. Seeds more or less flattened and pointed at hilum (Fig. 23) have also been recovered from the inner faces of syconium pieces. The characteristic pore known as orifice or ostiole, which connects the cavity of syconium with the exterior, is also seen on the terminal end of a broken piece (middle one in Fig. 22).

18. Anjan Grass *(Cenchrus ciliaris.)* (Pl. 3, Fig. 24)

Five carbonized caryopses of a grass, oblong in shape with rougose surface, measure 1.50-2.00 mm in length, 1.00-1.20 mm in breadth and 0.70-0.80 mm in thickness. Morphologically they compare with the caryopses of *Cenchrus Ciliaris.*

19. Walnut/Akhrot *(Juglans regia* L.) (Pl. 3, Fig.25)

Four pieces of hard and stony endocarp (shell), grooved and pitted irregularly, have been found in uncarbonized state. In their characteristic features, they compare with the endocarp of walnut *(Juglans regia)* fruit.

20. Almond *(Prunus amygdalus* Batsch.) (Pl. 33, Fig. 26)

Two pieces of woody and deeply pitted fruit shell have been found comparable to the endocarp of almond *(Prunus amygdalus).*

21. Castor *(Ricinus communis)* Two broken parts of oblong, crustaceous testa of seeds are comparable to those of castor *(Ricinus communis).*

22. Wood charcoal of Babul *(Acacia nilotica)*

A diffuse-porous wood. Vessels moderately large to small, solitary and in radial multiples of 2-3, oval to oval-round, open and occluded with gummy deposits, 7-16 per mm^2 and 50.70-170μm (av. 115.40 μm) in tangential diameter. Parenchyma paratracheal, paratracheal-zonate and apotracheal; paratracheal type abundant, forming one to many seriate sheath around the vessels and also in patches which join the vessels or vessel groups and rays, or extend tangentially beyond the contiguous rays to end blindly or become confluent between the vessels as paratracheal-zonate; apotracheal parenchymaa scattered or in group of several cells. Fibres libriform, round to oblong in cross-section, aligned in radial rows, forming broad tracts between rays and vessels, non-septate.

Rays fine to moderately broad, homogenous, mostly 2-3 seriate, 48. 2-110.5 μm in width; 17-37 cells and 1.80-3.92 μm in height.

Anatomically the charcoals resemble the wood of *Acacia* sp. of Leguminosae (Pearson and Brown 1932; Rao Ramesh and Purkayastha 1972). *Acacia nilotica* (Babul) has been found commonly growing at the site and therefore, the charcoals have been referred to the same.

Discussion

The cereal and legume crop remains from Hulas include rice *(Oryza sativa),* barley *(Hordeum vulgare),* two forms of wheat-dwarf wheat *(Triticum sphaerococcum)* and bread wheat *(T. aestivo-compactum)j* jowar millet *(Sorghum bicolor),* ragi millet *(Eleusine coracana),* oat *(Avena sativa),* cow pea *(Vignaa unguiclata),* lentil *(Lens culinaris),* grass pea or *Khesari (Lathyrus sativus),* chickpea or gram *(Cicer arietinum),* fieldpea *(Pisum arvensse),* horse gram *(Dolichos biflorus)* and green gram or *mung (Vigna radiata).* Besides, a seed of cotton *(Gossypium arboreuml herbaceum),* broken testa of oleiferous castor seeds *(Ricinus communis)* and fruit-shell pieces of walnut *(Juglans regia)* and almond *(Prunus amygdalus)* are other finds of considerable economic importance. Scrutiny of the contexts of these seed and fruit remains indicates that these were purposely brought into the site by the inhabitants. Amongst the remains of wild plants from Hulas, the seeds of ivy gourd or *kundru (Coccinia cordiffolia)* indicate the possible use of its fruits as a vegetable. Seeds of pipal tree appear as an accidental admixture. Charcoal remains indicate the common use of babul *(Acacia nilotica)* wood for fuel.

Wheat, barely, jowar-millet, lentil, chick pea, field pea and horse gram the staple crops of the Harappans, grown in Punjab and Rajasthan, during *ca.* 2300-1700 B.C. (Saraswat 1986: 32-38; 1988: 221-240; 1990-91: 83-88; Vishnu-Mittre and Savithri 1982: 205-221). In the recent collection from Bara culture at Sanghol in Ludhiana District, which has provided parallels with the Harappans in Punjab during *ca.* 2000-1500 B.C. similar forms of food grains alongwith grass pea or *khesari* have been found (Saraswat – unpublished paper). Presence of these crops at Hulas in the economy of Late Harappans, is an effect of cultural filter from the region of Punjab and Haryana. Rice and green gram have also been recorded at Sanghol, but in the subsequent phase of Painted Grey Ware culture from 1100 B.C. to 700 B.C. (Sharma 1983) mentioned the occurrence of blackgram *(Vigna mungo)* in the Hulas material sent to the Birbal Sahni Institute of Palaeobotany by the excavator; it is absent in my collection. The Late Harappans at Daulatpur in district Kurukshetra, Haryana also consumed blackgram (Vishnu-Mittre and Savithri 1982).*It is thus apparent that blackgram was also included in the crop husbandry of the Late Harappan communities in this region. One should keep in mind that in the identification of green gram and blackgram the shape and dimensions of hilum

is the principal criterion. The correlation between overall size of cotyledons and seeds without the remnant of hilum is a variable factor in both the species. Their identification is precarious when only the cotyledons are found preserved. Although, the cotyledons found at Hulas compare relatively more with those of greengram, yet the possibility of inclusion of blackgram cotyledons in the mixture, can not be ruled out.

Cultivation of rice by the Late Harappan communities in this region deserves special mention. The Harappan agriculture based mainly on the cultivation of wheat and barely, underwent a drastic change when the rice cultivation was opted from other cultures of Ganga-Yamuna *Doab.* The use of rice straw as *degraissant* in the clay of pottery and mud-plasters at Hulas indicates that this crop was much advantageously grown and utilized by the inhabitants. Without the fortunate condition of studying the impressions of husk it would not be possible to determine with certainty the actual species of cultivated *Oryza sativa* and wild *(O. rufipogon).* Plants of perennial wild rice *(O. rufipogon)* look similar to cultivated *O. saliva,* but for a few introgressed characters of annual wild *O. nivara* and forms of *O.rufipogon.* Characteristically, this aquatic wild rice with procumbent and floating stem grows either in water or swampy places or as a weed in cultivated field. Panicles give the appearance of cultivated rice; its grains are also edible. Thus, the weedy rice *(O.rufipogon)* is occasionally harvested alongwith the cultivated crop. Evidence from Hulas indicates that rice became an important crop with the Harappans during the course of their migration towards Gcnga-Yamuna *Doab* from the region of Punjab and Haryana, where they persisted at least until the beginning of the first millennium B.C. Nevertheless, this change in the subsistence pattern of the Harappans was not their cultural choice. Moreover, rice cultivation was not opted simply because it was available in. this new area, but because the Harappans must have given due considerations to the ecological conditions of the area for its advantageous cultivation.

According to Fairservis (1979: 66-89) the final eclipse of the Harappan style of agriculture may have occurred when the knowledge of the rice cultivation opened more southerly and easterly regions to the farmers. In the southerly region of the Harappan culture area the rice-imprints in pottery have been found at Lothal, district Ahmedabad, Gujarat. But these appear to be of undomesticated species (Fairservis 1979: 66-89). From another site, at Rangpur in Surendranagar District, Gujarat, the identification of rice-husk impressions in mud-plasters as to the wild or cultivated taxa, has remained tentative (Vishnu-Mittre 1974: 3-30). Fairservis considers that these remains represent the 'stage of incipient rice cultivation". While assuming this hypoyhesis for incipient cultivation, one

should keep in mind that in the marshes, where wild varieties rice grow in abundance, the clay is densely strewn with spikelets. The clay collected from marshy places, which abound in wild rices, may also have contributed to the presence of rice-impressions in the Harappan pottery. In the absence of detailed study of rice-imprints in the pottery and mud-plasters, it has not been possible to assess the cultivation of rice in Gujarat. However, at Hulas in the Upper Ganga-Yarnuna *Doab* the mixing of chaff and husk of rice with clay, prior to turning it into pottery and mud-plasters, has evidently demonstrated the cultivation or rice as a staple crop.

We have ample evidences of ragi-millet *(Eleusine coracana)* from neolithic and chalcolithic cultures in different regions of India, dating back as early as about 2500 B.C. and upto the first millennium B.C. The Harappans in Gujarat made use of ragi-millet along with other cereals and pulses. Ragi-millet has consistently been recorded at Harppan Rojdi, district Rajkot *(ca.* 2500-2000 B.C.) in the assemblage of jowar-millet, pearl-millet or *bajra,* little-millet, barely, lentil, grass pea, green gram, field-brassica, etc (Wagner 1983; Weber 1991). Other important records are from Surkotada, district Bhuj (Chanchala 1984) and Shikarpur in the Runn of Kutch (Chanchala, unpublished): Also from the post-urban phase at Oriyo Timbo in district Bhavanagar, millets belonging to *Eleusine, Panicum* and *Setaria* Aave been found to be consumed by the Late Harappans (Reddy 1991: 73-83). The remains of ragi-millet from Hulas also furnish the contextual evidence of its consumption by the Late Harappans in the upper Ganga-Yamuna *Doab.*

The cultivated oat *(Avena sativa)* from Hulas provided the sole record of this secondary crop of Mediterranean region in India. Remains of oat from Neolithic Burzahom *(ca.* 2400-1500 B.C.) and post-Neolithic Semthan *(ca.* 1500-1000 B.C.) in the Kashmir Valley, belong to wild and weedy form of *Avena fatua* (Buth and Kaw 1985: 109-113; Buth *et al.* 1982: 41-45). When the crops of wheat and barley diffused from Central Asia, the weed oats and other species also came along and infested the fields in Kashmir during the Neolithic times. *Avena fatua* at present is a common weed in cereal crops in much of Pakistan, particularly in the north, and adjoining Indian region of Kashmir, at an elevation between 1700 and 2200m. *Avena sativa* probably got derived from weed races *of A. sterlis* (Harlan 1977: 357-383). However, we do not know when it attained the status of the cultivated plant. Oat does not appear to have been important as a crop in antiquity, until much later. Probably it spread as a weed in wheat and barley crops of the Harappans and they also accepted the oat contamination in their food grains. This may have been the plausible reason why the presence of this fodder crop of minor importance could not be

worked out so far. However, the accidental inclusion of *Avena sativa* in the food grains has been recorded at Hulas.

Cow pea, commonly grown in India as one of the subsidiary crops of either jowar or *bajra-milltt,* was earlier known from Malwa culture *(ca.* 1600-1400 B.C.) at Daimabad in Ahmednagar District, Maharashtra (Vishnu-Mittre *et al.* 1986: 588-627). More or less, its contemporaneous evidence has now been recorded from Hulas. Seeds of cow pea are used mostly as pulse and pods also as a vegetable, when they are tender.

Oleiferous seeds of castor *(Ricinus communis)* from Hulas are recorded for the first time in the economy of the Harappaan culture. Earlier record from Satavahna period (ca.200 B.C. -100 A.D.) at Ter in Osmanabad District, Maharashtra (Vishnu-Mittre 1968: 87-106) belonged to much later times. Utility of castor seeds mentioned in the Egyptian monuments and Sanskrit literature suggests that in prehistoric times its oil was mainly used for illumination and medicinal purposes. It is well-known that the Harappans in the Indus valley grew the oleiferous crops of sesame and field-brassica. Castor seeds from Hulas have further affirmed the high value in which the seeds and oil were held by the Harappans for their varied uses in cooking, medicine, toiletry, illumination and rituals. Original home of the castor plant is uncertain; some authors favour Africa while others India, because it is found growing wild in the scrubby jungles of the outer Himalayas. The plant was, in all likelihood, cultivated by the Harappans in India.

Cotton textile of the Harappans in the Indus valley were the products of a sophisticated textile craft. Cultivation of cotton as a commercial crop for the establishment of textile industry occupied the foremost place in the Harappan agriculture during the 3rd millennium. Earlier evidences of cotton from the Indus valley civilization remained in the form of cloth-impressions from Harappa and a fibre of *Gossypium arboreum* from Mohenjodaro (Vats 1941; Gulati and Turner 1928). Now, the evidence of cotton seed from Hulas affirms that the Late Harappans continued to grow this important commercial fibre-crop, even in the later phase confronting the gradual depletion of their material economy.

The commercial and trade activities in the Late Harappan communities of the upper Ganga-Yamuna *Doab,* also brought material prosperity in the subsistence economy; otherwise how else can one explain the presence of walnut and almond at Hulas, which were very likely imported from far distant regions. Trees of walnut *(akhrot)* occur in the forests of the Himalayas, extending west to Afghanistan and

Baluchistan and east to Bhutan, at an elevation of 1000-3000 m; hills of upper Burma. Cultivated extensively in the Himalayas and also in the Khasia Hills of Meghalaya (Gamble 1902; Kanjilal and Gupta 1928; Stewart 1972) walnuts are also native to Central Asia, Iran, the Caucasus, Anatolia, the Balkan peninsula and southern Europe (Zukovskij 1950) and have occasionally been found from archaeological sites in Europe (Renfrew 1973). Similarly, almond is also indigenous to the region from Central Asia and Persia to Anatolia, cultivated in Mediterranean region and throughout southern Europe; sometimes escapes to wild. In the Indo-Pakistan region it runs wild also in Baluchistan, Kurram, Chitral, Gilgit and Astor, and cultivated in Kashmir at elevations of 760-2400 m as one of the principal crops (Gamble 1902; Zukovskij 1950; Stewart 1972). Nuts of wild almond are reported to be sold in the market in south-west Iran, and doubtless elsewhere in the Near East. There are definite evidences from the Kashmir Valley that the ancient settlers consumed walnuts and almond and made consistent use of the quality timber of walnut trees, which is highly valued for furniture and carving work, right from the Neolithic times, as early as the third millennium and upto Kushana period i.e., 200-300 A.D. (Chanchala 1988: 78-87; Lone *et al.* 1988 and 1993) Evidence of walnut and almond fruits from Hulas becomes particularly significant because these temperate zone nuts continued to be imported even in later phase when prosperous Harappan culture was facing widespread degeneration and fresh adaptation.

Kundru (Coccinia cordifolia) commonly grows as a climbing herb. Its fruits turn scarlet when ripe and eaten raw; green unripe fruits are used as vegetable. Seeds of *kundru* found at Hulas indicate that the fruits of this wild plant might have been consumed by the Late Harappans. Anjan grass or buffel-grass *(Cenchrus ciliaris)* represented by carbonized caryopses at Hulas, is a valuable fodder, especially for hay. Pipal *(Ficus religiosa)* is a large tree. Its leaves and fruit-bearing branches are lopped for fodder and ripe fruits are sometimes eaten by rural folk. The questions of the buffel grass caryopses and pipal-fruits getting into the habitational deposits remain unaccounted for. May be these were thrown about inadvertently. Charcoal pieces recovered in the ancient remains indicate the use of babul *(Acacia nilotica)* wood for fuel. Babul trees still commonly grown in the region of the site and in addition to firewood also provide valuable wood for making wheels, well-curbs, agricultural implements and tool handles. Leaves and pods are given as fodder to cattle, sheep and goats. Thorny boughs are used to fence agricultural fields, the gum is largely collected and used in native medicines. In how many ways this tree was used by the Late Harappans, it is difficult to ascertain on the factual grounds.

The plant remains collected only in one season of excavation work represent a fraction in which food and fuel plants, which accidentally or deliberately got burnt, have survived the preservation. A few macro-remains also got chance of being preserved in the absence of conflagration. Howsoever insufficient the data are it has become apparent that the Late Harappan settlers at Hulas enjoyed rich and varied food and agricultural products. Cereals and pulses of summer and winter crops were the important source of food. Cultivation of cotton, which brought about the economic prosperity and boom in trade of cotton textile with advanced communities in Iran and Mesopotamia during *ca.* 2350-1700 B.C., was still practiced by the Late Harappans at Hulas. Profitable cultivation of rice was also undertaken by them, considering the environmental potentiality of the area. Equally important were the dry-fruits in their subsistence economy, which have furnished minor but very important nutritional complements. Evidence of walnut and almond had amply demonstrated the ingenuity of the rural Late Harappans in Ganga-Yamuna *Doab,* for wistfully acquiring through trade the quality foodstuff of patrician class. The archaeological evidence borne out by a number of sites in Haryana and western Uttar Pradesh, bears ample testimony to an overall disintegration of material economy in the nebulous settlements of the Late Harappans. The credulous evidences of botanical remains from Hulas, however, highlight that the Harappan migrants in Upper Ganga-Yamuna *Doab* still enjoyed sound economic status in their food economy and crop husbandry.

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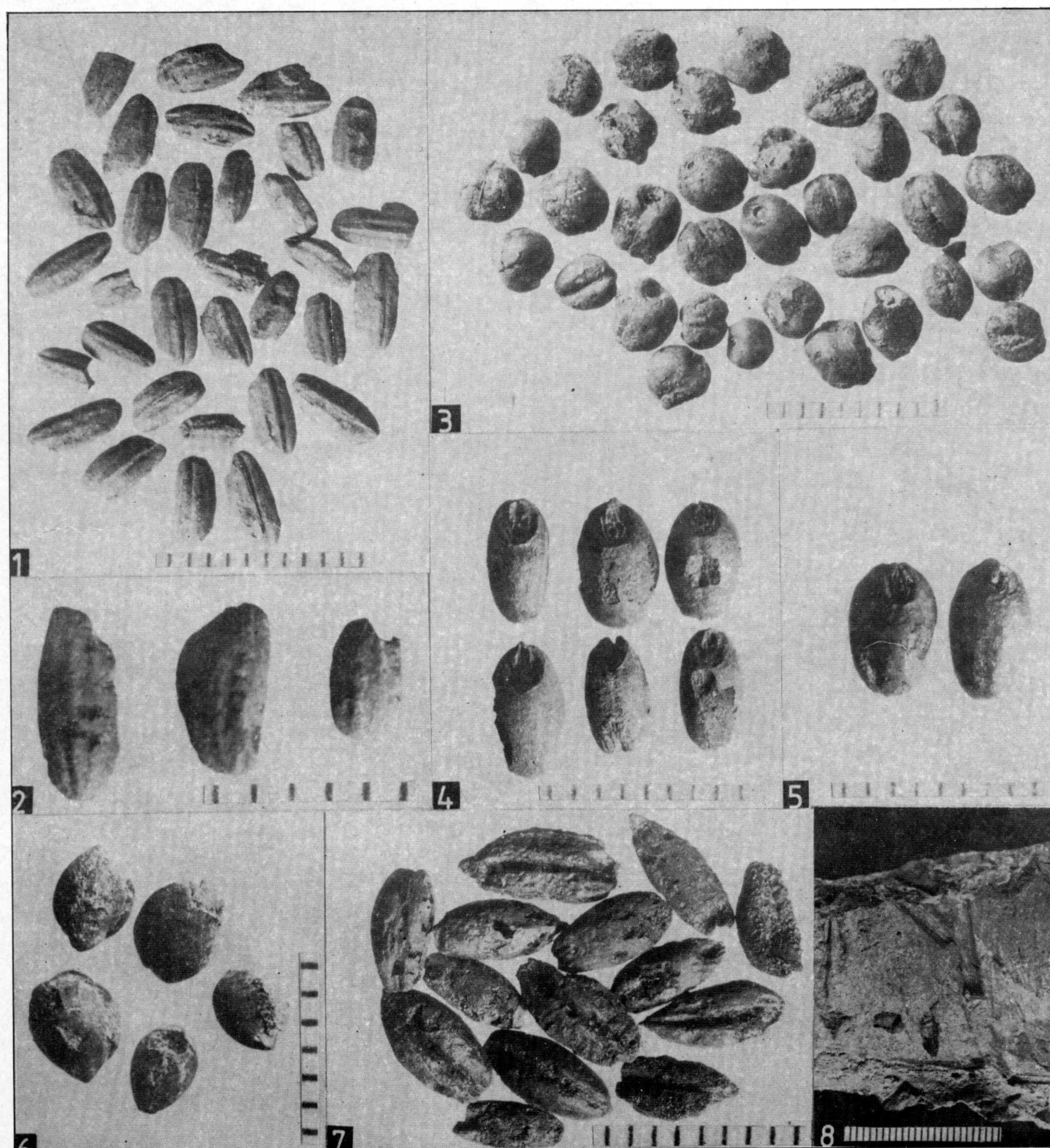
EXPLANATION OF PLATES

PLATE-1. Fig.1. Rice (*Oryza sativa*); Fig.2. Rice grains (Note the variation in their shape and size); Fig.3. Dwarf wheat (*Triticum sphaerococcum*); Fig.4. Bread wheat (*T. aestivum*); Fig.5. Bread wheat (*T. aestivocompactum*); Fig.6. Jowar millet (*Sorghum bicolour*); Fig.7. Barley (*Hordeum vulgare*); Fig.8. An imprint of barley grain in the mud-plaster.

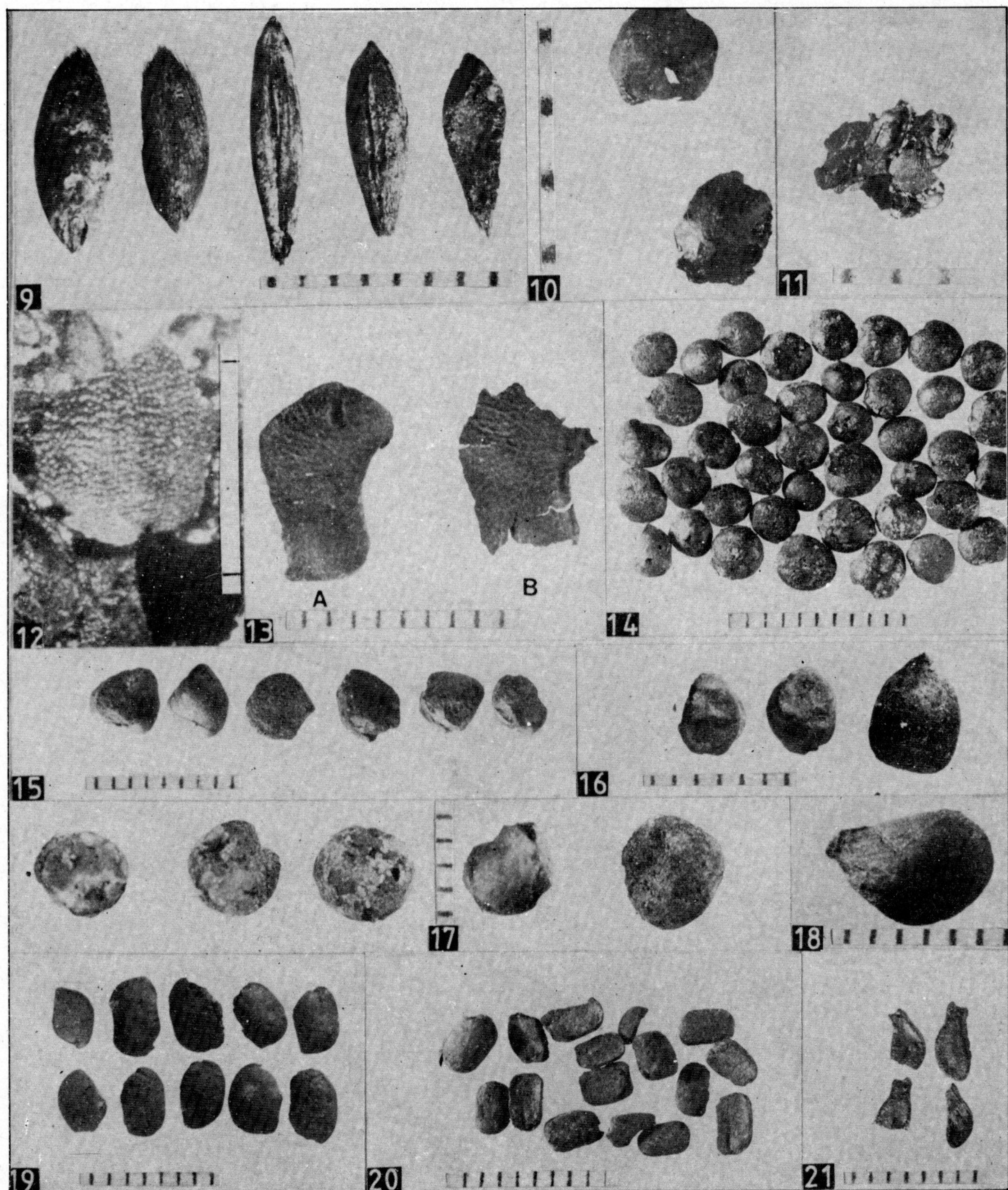
PLATE-2. Fig.9. Oat (*Avena sativa*); Fig.10. Ragi milllet (*Eleusine coracana*); Fig.11. Burnt tar-like matter in which grains of ragi millet are embedded; Fig.12. Enlarged ornamentation of ragi millet left in the impression on black tar-like material; Fig.13. A- Cotyledon and B- Scraped seed-coat of cow pea (*Vigna unguiculata*); Fig.14. Lentil (*Lens culinaris*); Fig.15. Grass-pea (*Lathyrus sativus*); Fig.16. Chick pea (*Cicer arietinum*); Fig.17. Field pea (*Pisum arvense*); Fig.18. Cottonseed (*Gossypium arboreum-llerbaceum*); Fig.19. Horsegram (*Dolichos biflorus*); Fig.20. Greengram (*Vigna radiate*); Fig.21. Seeds of ivy gourd (*Coccinia cordifolia*).

PLATE-3. Fig.22. Fruit-pieces of pipal tree (*Ficus religiosa*); Fig.23. Seeds of pipal-fruit; Fig.24. Seeds of buffel-grass (*Cenchrus ciliaris*); Fig.25. Fruit-shell pieces of walnut (*Juglans regia*); Fig.26. Fruit-shell pieces of almond (*Prunus amygdalus*); Fig.27. Seed-coat pieces of castor (*Ricinus communis*); Fig.28. Rice-husk fragment, x 180; Fig.29. Potsherd with rice-husk impressions; Fig.30. Husk impression of cultivated rice (*Oryza sativa*); Fig.31. Husk impression of wild rice (comparable to *O. rufipogon*).

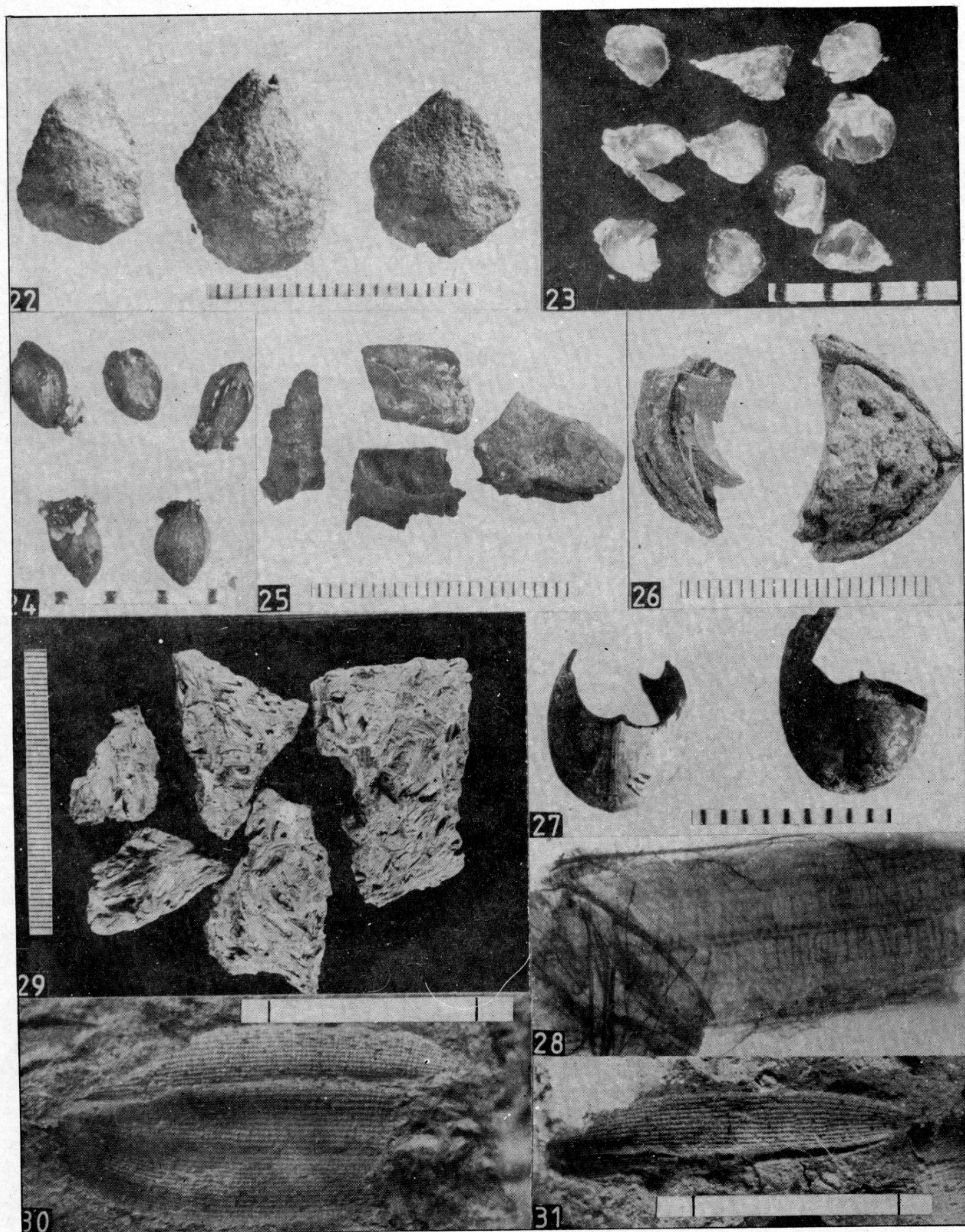
PLATE-4. Fig.32. Mud-plaster pieces with copious husk-impression of cultivated and wild forms of rice; Fig.33. Husk-impression of cultivated rice (*Oryza sativa*); Fig.34. Babul wood (*cf. Acacia nilotica*) in cross section, x 50; Fig.35. Babool wood in tangential longitudinal section, x 50.



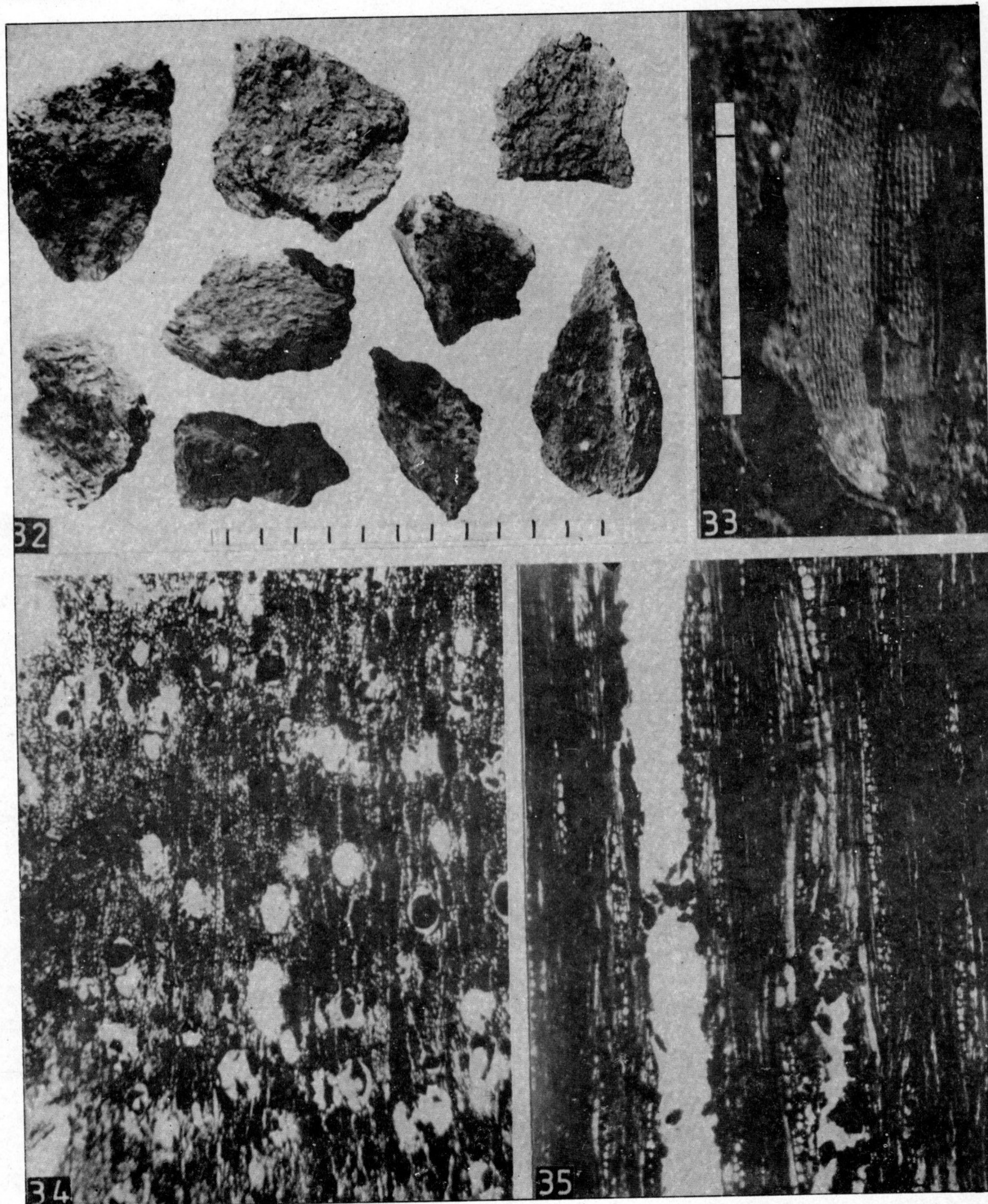
Plant remains from Hulas (Saraswat)



Plant remains from Hulas (Saraswat)



Plant remains from Hulas (Saraswat)



Plant remains from Hulas (Saraswat)

Appendix - IV

List of Radio-Carbon Dates

Site/State	No.	B.P.	B.C.	Calibrated Date	Cultural Assign	Material
1. PUNJAB						
i. Bara	TF-1207	3490+/-85 BP	1645 +/- 90 BC	1875BC 1838 BC 1818 BC 1800 BC 1782 BC cal.	Period I Upper Level Bara Culture.	Wood Charcoal
---Do -----	TF-1204	3690+/-150 BP	1850+/- 155 BC	2130 BC 2074BC 2045BC cal.	Period I Upper level Bara Culture.	Wood Charcoal.
---Do -----	TF-1205	3730+/-95 BP	1890+/- 100 BC	2140 BC cal.	Period I Lower Level Bara Culture.	Wood Charcoal.
---Do -----	TF-1206	3135+/- 100 BP	1280+/- 105 BC	1422BC cal.	Period I Lower Level Bara Culture.	Wood Charcoal.
ii. Sanghol	PRL-TL-7	none	1240+/- 450 BC	None	Bara Ware	Pottery
---Do----	PRL-TL-1	none	1140+/- 270 BC	None	Bara Ware	Pottery
---Do----	PRL-510	3550+/- 150 BP	1750+/- 155 BC	1895 BC cal.	Period I Post Urban Bara Culture	Charcoal
---Do----	PRL-509	3570+/- 150 BP	1725+/- 155 BC	1923 BC cal.	Period I Post Urban Bara Culture	Charcoal
---Do----	PRL-511	3740+/- 160BP	1900+/- 165BC	2181 BC 2166 BC 2142 BC cal.	Period I Post Urban Bara Culture	Charcoal
---Do----	PRL-513	3540+/- 150 BP	1695+/- 155 BC	1888 BC cal.	Period I Post Urban Bara Culture	Charcoal
---Do----	PRL-TL-10	none	2043+/- 330 BC	None	Period I Late Harappa	Soil in association with Period I

---Do---	PRL-TL-4	none	1233+/- 450 BC	None	Period II Late Harappa (Bara Ware)	Soil in association with Period II and Charcoal
II.HARYANA						
1. Balu	PRL-989	3250+/-150 BP	1400+/-155BC	1521 BC cal.	Harappan	Charcoal
--Do—	PRL-988	2390+/-110 BP	510+/-115BC	407 BC cal.	Harappan	Charcoal
--Do---	PRL-985	2330+/-100 BP	450+/-105BC	397 BC cal	Harappan	Charcoal
2. Banawali	PRL-204	3260+/-120BP	1410+/-125BC	1523BC cal	Period II Urban Harappan	Charcoal
--Do—	PRl-207	3100+/-100BP	1245+/-105BC	1406 BC Cal	Period II Urban Harappan	Charred grain
--Do—	PRL-203	3800+/-150BP	1965+/-155BC	2278 BC 2234 BC 2209 BC	Period II Urban Harappan	Charcoal
--Do—	PRL-205	3810+/-180BP	1975+/-185BC	2283BC Cal.	Period II Urban Harappan	Charcoal
3. Mitathal	PRL-290	3820+/-130BP	1985+/-135BC	2288BC Cal.	Period I Urban Phase	Charcoal
--Do—	PRL-292	4210+/-210BP	2385+/-215BC	2883BC 2796BC 2784BC Cal.	Period II B. "Punjab" Post-Urban Phase. Bara	Charcoal
--Do—	PRL-291	3600+/-110BP	1760+/-115BC	1961 BC Cal	Period IIA. Urban Phase	Charcoal
RAJASTHAN						
1. Kalibangan	TF-152	3615+/-85BP	1775+/-90BC	2014 BC 2006BC 1976BC	Period II (Urban Harappa)	Charcoal

Kalibangan	TF-145	3895+/-100BP	2060+/-105BC	2456BC 2412BC 2408BC	Period II (Urban Harappa)	Charcoal
---Do—	TF-147	3865+/-100BP	2030+/-105BC	2450Bc 2348BC Cal.	---Do—	--Do—
--Do—	TF-143	3510+/-110BP	1665+/-115BC	1880BC 1830BC 1829BC Cal.	Period II Urban Harappa	Wood
---Do—	Tf-163	3910+/-100BP	2075+/-105BC	2459 BC Cal.	---Do---	Charcoal
---Do—	TF-150	3740+/-100BP	1900+/-105BC	2181BC 2166BC 2142BC Cal.	Period II Urban Harappa	Charcoal
---Do—	TF-25	3930+/-110BP	2100+/-115BC	2464BC Cal.	---Do---	Charcoal mixed with charred bones
---Do—	TF-244	3250+/-90BP	1400+/-95BC	1521BC Cal.	---Do—	Charcoal
---Do—	TF-139	3775+/-100BP	1940+/-105BC	2200BC Cal.	Period II Urban Harappa	Charcoal
Kalibangan	TF-151	3800+/-100BP	1965+/-105BC	2278BC 2234BC 2209BC Cal.	Period II Urban Harappa	Charcoal
---Do—	TF-947	3765+/-85BP	1930+/-90BC	2197BC 2154BC 2148BC Cal.	Period II Urban Harappa	Wood + Charcoal
---Do—	TF-138	3075+/-100BP	1215+/-105BC	1391BC 1334BC 1327BC Cal.	---Do—	Charcoal
---Do—	TF-605	3810+/-105BP	1975+/-110BC	2283BC	---Do---	Charcoal

				Cal.		
Kailbangan	TF-153	3910+/-110BP	2075+/-115BC	2459BC Cal.	Period II Urban Harappa	Charcoal
---Do---	TF-946	3605+/-100BP	1765+/-105BC	1968BC Cal.	---Do---	Wood + Charcoal
---Do---	TF-948	3815+/-100BP	1980+/-105BC	2286Bc Cal.	Period II Urban Harappa	Wood + Charcoal
---Do---	TF-942	4055+/-11-BP	2225+/-115BC	2586BC Cal.	---Do---	Charcoal
---Do---	TF-142	3635+/-100BP	1795+/-105BC	2030BC 1990BC Cal.	Period II Urban Harappa	Charcoal
---Do---	TF-141	3705+/-110BP	1865+/-115BC	2134BC 2059BC 2048BC Cal.	Period II Urban Harappa	Charcoal
---Do---	TF-160	4060+/-100BP	2230+/-105BC	2587BC Cal.	---Do---	---Do---
---Do---	TF-149	3675+/-140BP	1835+/-145BC	2118BC 2083BC 2041BC Cal.	---Do--	---Do---
---Do---	TF-152 (BS)	3570+/-125BP	1725+/-130BC	1923BC Cal.	---Do---	---Do---
Kalibangan	TF-163 (BS)	3925+/-125BP	2090+/-130BC	2462BC Cal.	Period II Urban Harappa	Charcoal
---Do---	P-481	3879+/-72BP	2045+/-75BC	2453BC 2424BC 2398BC Cal.	---Do---	Charcoal
---Do---	TF-607	3930+/-120BP	1200+/-125BC	2464BC Cal.	---Do---	Charcoal Wheat
---Do---	TF-608	3910+/-110BP	2075+/-115BC	2459BC Cal	---Do---	Charcoal Wheat
---Do---	TF-149 (BS)	3585+/-120BP	745+/-125BC	1942 BC Cal.	Period II Urban	Charcoal

					Harappa	
UTTAR PRADESH						
1. Hulas	PRL-TL-0000?	NONE	1280BC	None	Post-Urban Harappa (Upper Urel)	Charcoal
---Do---	PRL-1031	3840+/-110BP	2005+/-115BC	2315BC Cal.	Early Late Harappa	Charcoal
---Do---	PRL-HLS-TL-17	NONE	955BC	None	Period I Urban Harappa	Soils in Association with Period I
---Do---	PRL-1032	4380+/-150BP	2560+/-155BC	3028BC 2985BC 2930BC Cal.	Early Late Harappan	Charcoal